The Rockbox Manual
for
Archos Recorder 6, 10, 15 and 20

rockbox.org
December 23, 2008

Rockbox

http://www.rockbox.org/
Open Source Jukebox Firmware

Rockbox and this manual is the collaborative effort of the Rockbox team and its contributors. See the appendix for a complete list of contributors.

© 2003-2008 The Rockbox Team and its contributors, © 2004 Christi Alice Scarborough, © 2003 José Maria Garcia-Valdecasas Bernal & Peter Schlenker.

Version r19569-081223. Built using pdfLaTeX.

Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.2 or any later version published by the Free Software Foundation; with no Invariant Sections, no Front-Cover Texts, and no Back-Cover Texts. A copy of the license is included in the section entitled "GNU Free Documentation License".

Contents

1 Introduction **10**
1.1 Welcome . . . 10
1.2 Getting more help . . . 10
1.3 Naming conventions and marks . . . 11

2 Installation **12**
2.1 Overview . . . 12
2.2 Prerequisites . . . 12
2.3 Installing Rockbox . . . 13
2.3.1 Automated Installation . . . 13
2.3.2 Manual Installation . . . 13
2.3.3 Enabling Speech Support (optional) . . . 15
2.4 Running Rockbox . . . 15
2.5 Updating Rockbox . . . 15
2.6 Uninstalling Rockbox . . . 16
2.6.1 Automatic Uninstallation . . . 16
2.6.2 Manual Uninstallation . . . 16

3 Quick Start **17**
3.1 Basic Overview . . . 17
3.1.1 The player's controls . . . 17
3.1.2 Turning the player on and off . . . 18
3.1.3 Putting music on your player . . . 18
3.1.4 The first contact . . . 18
3.1.5 Basic controls . . . 18
3.1.6 Basic concepts . . . 19
3.2 Customising Rockbox . . . 19

4 Browsing and playing **20**
4.1 File Browser . . . 20
4.1.1 File Browser Controls . . . 21
4.1.2 Context Menu . . . 21
4.1.3 Virtual Keyboard . . . 23
4.2 Database . . . 23
4.2.1 Introduction . . . 23
4.2.2 Initializing the Database . . . 24
4.2.3 The Database Menu . . . 24

4.2.4 Using the Database . . . 25
4.3 While Playing Screen . . . 26
4.3.1 WPS Key Controls . . . 28
4.3.2 Peak Meter . . . 28
4.3.3 The WPS Context Menu . . . 29
4.4 Quick Screens . . . 31
4.5 Working with Playlists . . . 32
4.5.1 Playlist terminology . . . 32
4.5.2 Creating playlists . . . 33
4.5.3 Adding music to playlists . . . 34
4.5.4 Modifying playlists . . . 35
4.5.5 Saving playlists . . . 35
4.5.6 Loading saved playlists . . . 36
4.5.7 Helpful Hints . . . 36

5 The Main Menu 37
5.1 Introducing the Main Menu . . . 37
5.2 Navigating the Main Menu . . . 37
5.3 Recent Bookmarks . . . 38
5.4 Files . . . 38
5.5 Database . . . 38
5.6 Now Playing/Resume Playback . . . 38
5.7 Settings . . . 38
5.7.1 Sound Settings . . . 39
5.7.2 Playback Settings . . . 39
5.7.3 General Settings . . . 39
5.7.4 Manage Settings . . . 39
5.7.5 Theme Settings . . . 39
5.7.6 Recording Settings . . . 39
5.8 Recording . . . 39
5.8.1 While Recording Screen . . . 39
5.9 Playlist . . . 40
5.10 Plugins . . . 41
5.11 System . . . 41
5.12 Quick Screen . . . 41

6 Sound Settings 43
6.1 Volume . . . 43
6.2 Bass . . . 43
6.3 Treble . . . 43
6.4 Balance . . . 44
6.5 Channels . . . 44
6.6 Stereo Width . . . 44
6.7 Loudness . . . 44

6.8 Auto Volume . . . 45
6.9 Super Bass . . . 45
6.10 MDB – Micronas Dynamic Bass . . . 45

7 Playback Settings 47
7.1 Shuffle . . . 47
7.2 Repeat . . . 47
7.3 Play Selected First . . . 48
7.4 Fast-Forward/Rewind . . . 48
7.5 Anti-Skip Buffer . . . 48
7.6 Fade on Stop/Pause . . . 48
7.7 Party Mode . . . 48
7.8 Auto-Change Directory . . . 48
7.9 Last.fm Log . . . 49
7.10 Cuesheet Support . . . 49
7.11 Skip Length . . . 49

8 General Settings 50
8.1 Playlist . . . 50
8.2 File View . . . 50
8.3 Database . . . 51
8.4 Display . . . 51
8.5 System . . . 54
8.5.1 Start Screen . . . 54
8.5.2 Battery . . . 54
8.5.3 Disk . . . 54
8.5.4 Idle Poweroff . . . 55
8.5.5 Limits . . . 55
8.5.6 Car Adapter Mode . . . 55
8.6 Bookmarking . . . 55
8.7 Language . . . 57
8.8 Voice . . . 57

9 Theme Settings 59

10 Recording Settings 60
10.1 Quality . . . 60
10.2 Frequency . . . 60
10.3 Source . . . 61
10.4 Channels . . . 61
10.5 Independent Frames . . . 61
10.6 File Split Options . . . 61
10.7 Prerecord Time . . . 62
10.8 Clear Recording Directory . . . 62

10.9 Clipping Light . . . 62
10.10 Trigger . . . 62

11 Plugins **64**
11.1 Games . . . 64
11.1.1 Blackjack . . . 64
11.1.2 BrickMania . . . 65
11.1.3 Bubbles . . . 66
11.1.4 Chessbox . . . 67
11.1.5 Chopper . . . 68
11.1.6 Dice . . . 68
11.1.7 Flipit . . . 68
11.1.8 Jewels . . . 69
11.1.9 MazezaM . . . 70
11.1.10 Minesweeper . . . 70
11.1.11 Pegbox . . . 71
11.1.12 Pong . . . 72
11.1.13 Robotfindskitten . . . 72
11.1.14 Rockblox . . . 73
11.1.15 Rockblox1d . . . 73
11.1.16 Sliding Puzzle . . . 74
11.1.17 Snake . . . 74
11.1.18 Snake 2 . . . 75
11.1.19 Sokoban . . . 76
11.1.20 Solitaire . . . 77
11.1.21 Spacerocks . . . 78
11.1.22 Star . . . 78
11.1.23 Sudoku . . . 79
11.1.24 Wormlet . . . 80
11.1.25 Xobox . . . 84
11.2 Demos . . . 84
11.2.1 Bounce . . . 84
11.2.2 Credits . . . 85
11.2.3 Cube . . . 85
11.2.4 Demystify . . . 86
11.2.5 Fire . . . 86
11.2.6 Logo . . . 86
11.2.7 Mandelbrot . . . 87
11.2.8 Mosaique . . . 87
11.2.9 Oscilloscope . . . 88
11.2.10 Plasma . . . 88
11.2.11 Snow . . . 89
11.2.12 Starfield . . . 89
11.2.13 VU meter . . . 90

11.3 Viewers . . . 90
11.3.1 Shortcuts . . . 90
11.3.2 Chip-8 Emulator . . . 91
11.3.3 JPEG viewer . . . 92
11.3.4 Movie Player . . . 93
11.3.5 Rockbox_flash . . . 93
11.3.6 Rockboy . . . 93
11.3.7 Search . . . 94
11.3.8 Sort . . . 94
11.3.9 Text Viewer . . . 94
11.3.10 VBRfix . . . 96
11.3.11 Wavplay . . . 96
11.3.12 ZXBox . . . 97
11.4 Applications . . . 99
11.4.1 Alpine CD changer emulator . . . 99
11.4.2 Battery Benchmark . . . 99
11.4.3 Calculator . . . 101
11.4.4 Calendar . . . 102
11.4.5 Chess Clock . . . 103
11.4.6 Clock . . . 104
11.4.7 Disk Tidy . . . 106
11.4.8 Firmware_flash . . . 107
11.4.9 Keybox . . . 107
11.4.10 Lamp . . . 107
11.4.11 md5sum . . . 107
11.4.12 Metronome . . . 108
11.4.13 Random Folder Advance Configuration . . . 108
11.4.14 Split Editor . . . 109
11.4.15 Stats . . . 112
11.4.16 Stopwatch . . . 112
11.4.17 Text Editor . . . 113

12 Advanced Topics 114
12.1 Customising the User Interface . . . 114
12.1.1 Getting Extras . . . 114
12.1.2 Loading Fonts . . . 114
12.1.3 Loading Languages . . . 114
12.2 Configuring the WPS . . . 114
12.2.1 WPS – General Info . . . 114
12.2.2 WPS – Build Your Own . . . 115
12.3 Managing Rockbox Settings . . . 118
12.3.1 Introduction to `.cfg` Files. . . . 118
12.3.2 Specifications for `.cfg` Files. . . . 118
12.3.3 The Manage Settings menu . . . 119

12.4 Firmware Loading . . . 119
12.4.1 Using ROLO (Rockbox Loader) . . . 120
12.5 Rockbox in Flash . . . 120
12.5.1 Introduction . . . 120
12.5.2 Terminology and Basic Operation . . . 120
12.5.3 Initial Flashing Procedure . . . 121
12.5.4 Updating the Rockbox Image in Flash . . . 122
12.5.5 Restoring the Original Flash ROM Contents . . . 122

A File formats **123**
A.1 Supported file formats . . . 124

B WPS Tags **125**
B.1 Status Bar . . . 125
B.2 ID3 Info . . . 125
B.3 Power Related Information . . . 126
B.4 File Info . . . 126
B.5 Playlist/Song Info . . . 127
B.6 Runtime Database . . . 127
B.7 Virtual LED . . . 127
B.8 Repeat Mode . . . 128
B.9 Playback Mode Tags . . . 128
B.10 Changing Volume . . . 128
B.11 Settings . . . 129
B.12 Images . . . 129
B.13 Alignment . . . 130
B.14 Conditional Tags . . . 130
B.15 Real Time Clock . . . 131
B.16 Other Tags . . . 131

C Config file options **132**

D User feedback **136**
D.1 Bug reports . . . 136
D.1.1 Rules for submitting new bug reports . . . 136
D.2 Feature ideas . . . 136
D.2.1 Rules for submitting a new feature idea . . . 136
D.2.2 Features we will not implement . . . 137

E Changelog **139**
E.1 What is new since v3.0? . . . 139
E.1.1 New features . . . 139
E.1.2 Enhancements . . . 139
E.2 What is new since v2.5? . . . 139

E.2.1 New features 139
E.2.2 Enhancements 141
E.2.3 New codecs supported 141

F Credits **143**

G Licenses **146**
G.1 GNU Free Documentation License 146
G.2 The GNU General Public License 154

1 Introduction

1.1 Welcome

This is the manual for Rockbox. Rockbox is an open source firmware replacement for a growing number of digital audio players. Rockbox aims to be considerably more functional and efficient than your device's stock firmware while remaining easy to use and customisable. Rockbox is written by users, for users. Not only is it free to use, it is also released under the GNU General Public License (GPL), which means that it will always remain free both to use and to change.

Rockbox has been in development since 2001, and receives new features, tweaks and fixes each day to provide you with the best possible experience on your digital audio player. A major goal of Rockbox is to be simple and easy to use, yet remain very customisable and configurable. We believe that you should never need to go through a series of menus for an action you perform frequently. We also believe that you should be able to configure almost anything about Rockbox you could want, pertaining to functionality. Another top priority of Rockbox is audio playback quality – Rockbox, for most models, includes a wider range of sound settings than the device's original firmware. A lot of work has been put into making Rockbox sound the best it can, and improvements are constantly being made. All models have access to a large number of plugins, including many games, applications, and graphical "demos". You can load different configurations quickly for different purposes (e.g. a large font for in your car, different sound settings for at home). Rockbox features a very wide range of languages, and all supported models also have the ability to talk to you – menus can be voiced and filenames spelled out or spoken.

1.2 Getting more help

This manual is intended to be a comprehensive introduction to the Rockbox firmware. There is, however, more help available. The Rockbox website at http://www.rockbox.org/ contains very extensive documentation and guides written by members of the Rockbox community and this should be your first port of call when looking for further help.

If you cannot find the information you are searching for on the Rockbox website there are a number of support channels you should have a look at. You can try the Rockbox forums located at http://forums.rockbox.org/. Another option are the mailing lists which can be found at http://www.rockbox.org/mail/. From that page you can subscribe to the lists and browse the archives. For searching the list archives simply use the search field that is located on the left side of the website. Also you can ask on IRC. The main

channel for Rockbox is `#rockbox` on irc://irc.freenode.net. A bunch of helpful developers and users are usually around. Just join and ask – if someone knows the answer you'll usually get an answer pretty quickly. More information including IRC logs can be found at http://www.rockbox.org/irc/. We also have a web client for joining the rockbox IRC channel so there is no need for you to install additional software to your computer.

If you think you have found a bug please make sure it actually is a bug and is still present in the most recent version of rockbox. You should try to confirm that by using the above mentioned support channels first. After that you can submit that issue to our tracker. Refer to section D (page 136) for details on how to use the tracker.

1.3 Naming conventions and marks

We have some conventions especially on naming that are intended to be consistent throughout this manual.

Manufacturer and product names are formatted in accordance with the standard rules of English grammar, e.g. "Archos playback is currently unsupported". Manufacturer and model names are proper nouns, and thus are written beginning with a capital letter.

This manual has some parts that are marked with icons on the margin to help you finding important parts or parts you could skip. The following icons are used:

Note: This indicates a note. A note starts always with the text "Note". For easier finding of notes we have put this an icon in the margin like here. Notes are used to mark information that could help you or indicate a possible "weirdness" in rockbox that would be explained.

Warning: This is a warning. In contrast to notes mentioned above, a warning should be taken more seriously. While ignoring notes will not cause any serious damage ignoring warnings *could* cause serious damage. If you are new to rockbox you should really read the warnings before doing anything that is warned about.

This icon marks a section that is intended especially for the blind and visually impaired. As they cannot read the manual in the same way sighted people do we have added some additional descriptions. If you are not blind or visually impaired you most likely can completely skip these blocks. To make this easier, there is an icon shown in the margin on the right.

Links to the wiki are abbreviated by the name of the wiki page. Those names are still linked so you can simply follow them like any other link in this manual. If you want to access a wiki page manually go to ☞ http://www.rockbox.org/wiki/ and type the page name in the "Go" box at the top of the page. Links to wiki pages are also indicated by the symbol ☞ in front of the page name.

2 Installation

2.1 Overview

There are two ways of installing Rockbox: automated and manual. While the manual way is older, more tested and proven to work correctly, the automated installation is based on a nice graphical application that does almost everything for you. It is still important that you have an overview of the installation process to be able to select the correct installation options.

Rockbox itself comes as a single package. There is no need to install additional software for running Rockbox.

Apart from the required parts there are some addons you might be interested in installing.

Fonts. Rockbox can load custom fonts. The fonts are distributed as a separate package and thus need to be installed separately. They are not required to run Rockbox itself but a lot of themes require the fonts package to be installed.

Themes. The view of Rockbox can be customized by themes. Depending on your taste you might want to install additional themes to change the look of Rockbox.

2.2 Prerequisites

Before installing Rockbox you should make sure you meet the prerequisites. You may need some additional tools for installation. In most cases these will already be available on your computer, but if not, installing some additional software might be necessary.

USB connection. To transfer Rockbox to your player you need to connect it to your computer. For manual installation/uninstallation, or should autodetection fail during automatic installation, you need to know where to access the player. On Windows this means you need to figure out the drive letter associated with the player. On Linux you need to know the mount point of your player.

For manual installation and customization additional software is required.

ZIP utility. Rockbox is distributed as a compressed archive using the `.zip` format. Your computer will normally already have a means of handling such archive files. Windows XP has built-in support for `.zip` files and presents them to you as directories unless you have installed a third party program that handles compressed files. For other operating systems this may vary. If the `.zip` file format is not recognised on

your computer you can find a program to handle them at http://www.info-zip.org/ or http://sevenzip.sf.net/, both of which can be downloaded and used free of charge.

Text editor. As you will see in the following chapters, Rockbox is highly configurable. In addition to saving configurations, Rockbox also allows you to create customised configuration files. If you would like to edit custom configuration files on your computer, you will need a text editor like Windows' "Wordpad".

2.3 Installing Rockbox

2.3.1 Automated Installation

To automatically install Rockbox, download the official installer and housekeeping tool Rockbox Utility. It allows you to:

- Automatically install all needed components for using Rockbox ("Small Installation")
- Automatically install all suggested components ("Full Installation")
- Selectively install optional components
- Install additional themes
- Install voice files and generate talk clips
- Uninstall all components you installed using Rockbox Utility

Prebuilt binaries for Windows, Linux and MacOS X are available at the ☞RockboxUtility wiki page.

Warning: When first starting Rockbox Utility run "Autodetect", found in the configuration dialog (File → Configure). Autodetection can detect most player types. If autodetection fails or is unable to detect the mountpoint, make sure to enter the correct values. The mountpoint indicates the location of the player in your filesystem. On Windows, this is the drive letter the player gets assigned, on other systems this is a path in the filesystem.

Note: Rockbox Utility currently lacks some guiding messages. Please have a look at the manual installation instructions if you are stuck during installation.

2.3.2 Manual Installation

Choosing a Rockbox version

There are three different types of firmware binaries available from the Rockbox website: Release version, current build and daily build. You need to decide which one you want to install and get the appropriate version for your player.

Release. The release version is the latest stable release, free of known critical bugs. The current stable release of Rockbox, version 3.1, is available at http://www.rockbox.org/download/.

Current Build. The current build is built at each source code change to the Rockbox SVN repository and represents the current state of Rockbox development. This means that the build could contain bugs but most of the time is safe to use. You can download the current build from http://build.rockbox.org/.

Archived Build. In addition to the release version and the current build, there is also an archive of daily builds available for download. These are built once a day from the latest source code in the SVN repository. You can download archived builds from http://www.rockbox.org/daily.shtml.

Warning: Because current builds and daily builds are development versions which change frequently, they may behave differently than described in this manual, or they may introduce new (and maybe annoying) bugs. If you do not want to get undefined behaviour from your player, you should stick to the current stable release if there is one for your player. If you want to help with project development, you can try development builds and help by reporting bugs. Just be aware that these are development builds that are highly functional but not perfect!

Installing the firmware

1. Download your chosen version of Rockbox from the links in the previous section.
2. Connect your player to the computer via USB as described in the manual that came with your player.
3. Take the `.zip` file that you downloaded and use the "Extract all" command of your unzip program to extract the files onto your player.

   Note: The entire contents of the `.zip` file should be extracted directly to the root of your player's drive. Do not try to create a separate directory on your player for the Rockbox files! The `.zip` file already contains the internal structure that Rockbox needs.

Note: If the contents of the `.zip` file are extracted correctly, you will have a file called `ajbrec.ajz` in the main directory of your player's drive, and also a directory called `.rockbox`, which contains a number of other directories and system files needed by Rockbox. If you receive a "-1" error when you start Rockbox, you have not extracted the contents of the `.zip` file to the proper location.

Installing the fonts package

Rockbox has a fonts package that is available at http://www.rockbox.org/daily.shtml or from the *extras* link in the menu on the Rockbox website. While the current builds

and daily builds change frequently, the fonts package rarely changes and is therefore not included in these builds. When installing Rockbox for the first time, you should install the fonts package. The release version, on the other hand, does not change, so fonts are included with it.

1. Download the fonts package from the link above.
2. Take the file that you downloaded above, and use the "Extract all" command of your unzip program to extract the files in the `.zip` file onto your player. As with the firmware installation, the entire contents of the fonts `.zip` should be extracted directly to the root of your player's drive. Do not try to create a separate directory on your player for the fonts! The `.zip` already contains the correct internal structure.

2.3.3 Enabling Speech Support (optional)

If you wish to use speech support you will also need a voice file, English ones are available from http://www.rockbox.org/daily.shtml. Download the "voice" package for your player and unzip it directly to the root of your player. You should now find an `english.voice` in the `/.rockbox/langs` directory on your player. Voice menus are enabled by default and will come into effect after a reboot. See section 8.8 (page 57) for details on voice settings.

2.4 Running Rockbox

Remove your player from the computer's USB port. Unplug any connected power supply and turn the unit off. When you next turn the unit on, Rockbox should load. When you see the Rockbox splash screen, Rockbox is loaded and ready for use.

2.5 Updating Rockbox

Updating Rockbox is easy even if you do not use the Rockbox Utility. Download a Rockbox build. (The latest release of the Rockbox software will always be available from http://www.rockbox.org/download/). Unzip the build to the root directory of your player like you did in the installation stage. If your unzip program asks you whether to overwrite files, choose the "Yes to all" option. The new build will be installed over your current build.

Note: If you use Rockbox Utility be aware that it cannot detect manually installed components.

2.6 Uninstalling Rockbox

2.6.1 Automatic Uninstallation

You can uninstall Rockbox automatically by using Rockbox Utility. If you installed Rockbox manually you can still use Rockbox Utility for uninstallation but will not be able to do this selectively.

2.6.2 Manual Uninstallation

If you would like to go back to using the original Archos software, connect the player to your computer, and delete the `ajbrec.ajz` file.

If you wish to clean up your disk, you may also wish to delete the `.rockbox` directory and its contents. Turn the Archos off. Turn the player back on and the original Archos software will load.

3 Quick Start

3.1 Basic Overview

3.1.1 The player's controls

Throughout this manual, the buttons on the player are labelled according to the picture above. Whenever a button name is prefixed by "Long", a long press of approximately one second should be performed on that button. The buttons are described in detail in the following paragraph.

Additional information for blind users is available on the Rockbox website at ☞BlindFAQ.

Holding the Jukebox in front of you, there should be three rectangular buttons in a horizontal line towards the middle of the unit, and below this to the left there is a circular four button array with the circular **Play** button as a fifth button in the centre. These are the navigation controls. Below the rectangular buttons and to the right of the circular buttons are two small round buttons one above the other.

The **On** button is the topmost of the two buttons located below and to the left of the navigation controls whereas the lower of these two is called **Off**. The small round button in the middle of the large circular button array is called **Play** button. To the right of the **Play** button there is the **Right** button, left of it is the **Left**, above it **Up**, and below the **Play** button there is the **Down** button placed. In the row of three rectangular buttons the following buttons can be found (from left to right): **F1**, **F2** and **F3**.

3.1.2 Turning the player on and off

To turn on and off your Rockbox enabled player use the following keys:

Key	Action
Long **On**	Start Rockbox
Double tap **Off** when playback is stopped	Shutdown Rockbox

On shutdown, Rockbox automatically saves its settings.

In the unlikely event of a software failure, hardware poweroff or reset can be performed by holding down **Off** until the player shuts off or reboots.

3.1.3 Putting music on your player

With the player connected to the computer as an MSC/UMS device (like a USB Drive), music files can be put on the player via any standard file transfer method that you would use to copy files between drives (e.g. Drag 'n' Drop). The default directory structure that is assumed by some parts of Rockbox (missing-tag fallback in some WPSes) uses the parent directory of a song as the Album name, and the parent directory of that folder as the Artist name. While files may be organized however you like, WPSes may display information incorrectly if your files are not properly tagged, and you have your music organized in a way different than they assume when attempting to guess the Artist and Album names from your filetree.

3.1.4 The first contact

After you have first started the player you'll be presented by the Main Menu. From this menu you can reach every function of Rockbox, for more information (see section 5.1 (page 37)). To browse the files on you player select Files (see section 4.1 (page 20)), and to browse in a view that is based on the meta-data[1] of your audio files, select Database (see section 4.2 (page 23)).

3.1.5 Basic controls

When browsing files and moving through menus you usually get a list view presented. The navigation in these lists are usually the same and should be pretty intuitive. In the tree view use **Down** and **Up** to move around the selection. Use **Right** or **On** to select an item. When browsing the file system selecting an audio file plays it. The view switches to the "While playing screen", usually abbreviated as "WPS" (see section 4.3 (page 26). The dynamic playlist gets replaced with the contents of the current directory.

[1] ID3 Tags, Vorbis comments, etc.

This way you can easily treat directories as playlists. The created dynamic playlist can be extended or modified while playing. This is also known as "on-the-fly playlist". To go back to the File Browser stop the playback with the **Off** button or return to the file browser while keeping playback running using **On**. In list views you can go back one step with **Left**.

3.1.6 Basic concepts

Playlists

Rockbox is playlist oriented. This means that every time you play an audio file, a so-called "dynamic playlist" is generated, unless you play a saved playlist. You can modify the dynamic playlist while playing and also save it to a file. If you do not want to use playlists you can simply play your files directory based. Playlists are covered in detail in section 4.5 (page 32).

Menu

From the menu you can customise Rockbox. Rockbox itself is very customisable. Also there are some special menus for quick access to frequently used functions.

Context Menu

Some views, especially the file browser and the WPS have a context menu. From the file browser this can be accessed with Long **Play**. The contents of the context menu vary, depending on the situation it gets called. The context menu itself presents you with some operations you can perform with the currently highlighted file. In the file browser this is the file (or directory) that is highlighted by the cursor. From the WPS this is the currently playing file. Also there are some actions that do not apply to the current file but refer to the screen from which the context menu gets called. One example is the playback menu, which can be called using the context menu from within the WPS.

3.2 Customising Rockbox

Rockbox' User Interface can be customised using "Themes". Themes usually only affect the visual appearance, but an advanced user can create a theme that also changes various other settings like file view, LCD settings and all other settings that can be modified using `.cfg` files. This topic is discussed in more detail in section 12.3 (page 118). The Rockbox distribution comes with some themes that should look nice on your player.

Note: Some of the themes shipped with Rockbox need additional fonts from the fonts package, so make sure you installed them. Also, if you downloaded additional themes from the Internet make sure you have the needed fonts installed as otherwise the theme may get displayed garbled.

4 Browsing and playing

4.1 File Browser

Figure 4.1: The file browser

Rockbox lets you browse your music in either of two ways. The File Browser lets you navigate through the files and directories on your player, entering directories and executing the default action on each file. To help differentiate files, each file format is displayed with an icon.

The Database Browser, on the other hand, allows you to navigate through the music on your player using categories like album, artist, genre, etc.

You can select whether to browse using the File Browser or the Database Browser by selecting either Files or Database in the Main Menu. If you choose the File Browser, the Show Files setting lets you select what types of files you wish to view. See section 8.2 (page 51) for more information on the Show Files setting.

Note: The File Browser allows you to manipulate your files in ways that are not available within the Database Browser. Read more about Database in section 4.2 (page 23). The remainder of this section deals with the File Browser.

4.1.1 File Browser Controls

Key	Action
Up/Down	Go to previous/next item in list. If you are on the first/last entry, the cursor will wrap to the last/first entry.
On+Up/ Down	Move one page up/down in the list.
Left	Go to the parent directory.
Right	Executes the default action on the selected file or enters a directory.
On	If there is an audio file playing, returns to the While Playing Screen (WPS) without stopping playback.
Off	Stops audio playback.
Long **Play**	Enter the Context Menu
F1	Enter the Main Menu
F2	Switches to the Quick Screen (see section 5.12 (page 41))
F3	Switches to the Display Quick Screen

The functions of the F keys are also summarised on the button bar at the bottom of the screen.

4.1.2 Context Menu

Figure 4.2: The Context Menu

The Context Menu allows you to perform certain operations on files or directories. To access the Context Menu, position the selector over a file or directory and access the context menu with Long **Play**.

Note: The Context Menu is a context sensitive menu. If the Context Menu is invoked on a file, it will display options available for files. If the Context Menu is invoked on a directory, it will display options for directories.

The Context Menu contains the following options (unless otherwise noted, each option pertains both to files and directories):

Playlist. Enters the Playlist Submenu (see section 4.5.3 (page 34)).

Playlist Catalog. Enters the Playlist Catalog Submenu (see section 4.5.2 (page 33)).

Rename. This function lets the user modify the name of a file or directory.

Cut. Copies the name of the currently selected file or directory to the clipboard and marks it to be 'cut'.

Copy. Copies the name of the currently selected file or directory to the clipboard and marks it to be 'copied'.

Paste. Only visible if a file or directory name is on the clipboard. When selected it will move or copy the clipboard to the current directory.

Delete. Deletes the currently selected file. This option applies only to files, and not to directories. Rockbox will ask for confirmation before deleting a file. Press **Play** to confirm deletion or any other key to cancel.

Delete Directory. Deletes the currently selected directory and all of the files and subdirectories it may contain. Deleted directories cannot be recovered. Use this feature with caution!

Open with. Runs a viewer plugin on the file. Normally, when a file is selected in Rockbox, Rockbox automatically detects the file type and runs the appropriate plugin. The Open With function can be used to override the default action and select a viewer by hand. For example, this function can be used to view a text file even if the file has a non-standard extension (i.e., the file has an extension of something other than `.txt`). See section 11.3 (page 90) for more details on viewers.

Create Directory. Create a new directory in the current directory on the disk.

Properties. Shows properties such as size and the time and date of the last modification for the selected file. If used on a directory, the number of files and subdirectories will be shown, as well as the total size.

Set As Recording Directory. Save recordings in the selected directory.

Add to Shortcuts. Adds a link to the selected item in the `shortcuts.link` file. If the file does not already exist it will be created in the root directory. Note that if you create a shortcut to a file, Rockbox will not open it upon selecting, but simply bring you to it's location in the File Browser.

4.1.3 Virtual Keyboard

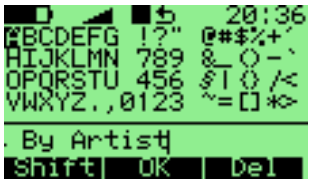

Figure 4.3: The virtual keyboard

This is the virtual keyboard that is used when entering text in Rockbox, for example when renaming a file or creating a new directory. The virtual keyboard can be easily changed by making a text file with the required layout. More information on how to achieve this can be found on the Rockbox website at ☞LoadableKeyboardLayouts.

Key	Action
Left / **Right** / **Up** / **Down**	Move about the virtual keyboard (moves the solid cursor)
On + **Left** or **On** + **Right**	Move the line cursor within the text line
Play	Inserts the selected keyboard letter at the current cursor position
Off	Exits the virtual keyboard without saving any changes
F1	Shifts between the upper case, lower case and accented keyboards
F2	Exits the virtual keyboard and saves any changes
F3	Deletes the character before the line cursor

4.2 Database

4.2.1 Introduction

This chapter describes the Rockbox music database system. Using the information contained in the tags (ID3v1, ID3v2) in your audio files, Rockbox builds and maintains a database of the music files on your player and allows you to browse them by Artist, Album, Genre, Song Name, etc. The criteria the database uses to sort the songs can be completely customised. More information on how to achieve this can be found on the Rockbox website at ☞DataBase.

4.2.2 Initializing the Database

The first time you use the database, Rockbox will scan your disk for audio files. This can take quite a while depending on the number of files on your player. This scan happens in the background, so you can choose to return to the Main Menu and continue to listen to music. If you shut down your player, the scan will continue next time you turn it on. After the scan is finished you may be prompted to restart your player before you can use the database.

Ignoring Directories During Database Initialization

You may have directories on your player whose contents should not be added to the database. Placing a file named `database.ignore` in a directory will exclude the files in that directory and all its subdirectories from scanning their tags and adding them to the database. This will speed up the database initialization.

If a subdirectory of an 'ignored' directory should still be scanned, place a file named `database.unignore` in it. The files in that directory and its subdirectories will be scanned and added to the database.

4.2.3 The Database Menu

Auto Update If Auto update is set to on, each time the player boots, the database will automatically be updated. Auto Update does not detect deleted files. To remove deleted files from the database you need to run Update Now.

Initialize Now You can force Rockbox to rescan your disk for tagged files by using the Initialize Now function in the Database Menu.

Warning: Initialize Now removes all database files (removing runtimedb data also) and rebuilds the database from scratch.

Update Now Update now causes the database to detect new and deleted files Unlike Initialize Now, the Update Now function does not remove runtime database information.

Gather Runtime Data When enabled, rockbox will record how often and how long a track is being played, when it was last played and its rating. This information can be displayed in the WPS and is used in the database browser to, for example, show the most played, unplayed and most recently played tracks.

Export Modifications This allows for the runtime data to be exported to the file `/.rockbox/database_changelog.txt`, which backs up the runtime data in ASCII format. This is needed when database structures change, because new code cannot read old database code. But, all modifications exported to ASCII format should be readable by all database versions.

Import Modifications. Allows the `/.rockbox/database_changelog.txt` backup to be conveniently loaded into the database. If Auto Update is enabled this is performed automatically when the database is initialized.

4.2.4 Using the Database

Once the database has been initialized, you can browse your music by Artist, Album, Genre, Song Name, etc. To use the database, go to the Main Menu and select Database.

Note: You may need to increase the value of the Max files in dir browser setting (Settings → General Settings → System → Limits) in order to view long lists of tracks in the ID3 database browser.

There is no option to turn off database completely. If you do not want to use it just do not do the initial build of the database and do not load it to RAM.

Tag	Type	Origin
filename	string	system
album	string	id tag
albumartist	string	id tag
artist	string	id tag
comment	string	id tag
composer	string	id tag
genre	string	id tag
grouping	string	id tag
title	string	id tag
bitrate	numeric	id tag
discnum	numeric	id tag
year	numeric	id tag
tracknum	numeric	id tag/filename
autoscore	numeric	runtime db
lastplayed	numeric	runtime db
playcount	numeric	runtime db
Pm (play time - min)	numeric	runtime db
Ps (play time - sec)	numeric	runtime db
rating	numeric	runtime db
commitid	numeric	system
entryage	numeric	system
length	numeric	system
Lm (track len - min)	numeric	system
Ls (track len - sec)	numeric	system

4.3 While Playing Screen

The While Playing Screen (WPS) displays various pieces of information about the currently playing audio file. The appearance of the WPS can be configured using WPS configuration files. The items shown depend on your configuration – all item can be turned on or off independently. Refer to section B (page 125) for details on how to change the display of the WPS.

- Status bar: The Status bar shows Battery level, charger status, volume, play mode, repeat mode, shuffle mode and clock. In contrast to all other items, the status bar is always at the top of the screen.
- (Scrolling) path and filename of the current song.
- The ID3 track name.

- The ID3 album name.
- The ID3 artist name.
- Bit rate. VBR files display average bitrate and "(avg)"
- Elapsed and total time.
- A slidebar progress meter representing where in the song you are.
- Peak meter.

Note:

- The number of lines shown depends on the size of the font used.
- The peak meter is only visible if you turn off the status bar or if using a small font that gives 8 or more display lines.

See section 12.2 (page 114) for details of customising your WPS (While Playing Screen).

4.3.1 WPS Key Controls

Key	Action
Up / Down	Volume up/down.
Left	Go to beginning of track, or if pressed while in the first seconds of a track, go to previous track.
Long **Left**	Rewind in track.
Right	Go to next track.
Long **Right**	Fast forward in track.
Play	Toggle play/pause.
Off	Stop playback.
On	Return to the File Browser.
Long **Play**	Enter WPS Context Menu.
F1	Enter Main Menu.
F2	Switches to the Quick Screen. (see section 5.12 (page 41))
F3	Toggles Display quick screen.
F1+Down	Key lock on/off.
F1+Play	Mute on/off.
On + Up/Down	Show Pitch Screen (see section 4.3.3 (page 30)).
F1 + On	Enter ID3 Viewer.
On + Left or Short **Right** + Long **Right**	Skip to the next directory.
On + Right or Short **Left** + Long **Left**	Skip to the previous directory.

4.3.2 Peak Meter

The peak meter can be displayed on the While Playing Screen and consists of several indicators. For a picture of the peak meter, please see the While Recording Screen in section 5.8.1 (page 39).

The bar: This is the wide horizontal bar. It represents the current volume value.

The peak indicator: This is a little vertical line at the right end of the bar. It indicates the peak volume value that occurred recently.

The clip indicator: This is a little black block that is displayed at the very right of the scale when an overflow occurs. It usually does not show up during normal playback

unless you play an audio file that is distorted heavily. If you encounter clipping while recording, your recording will sound distorted. You should lower the gain.

Note: Note that the clip detection is not very precise. Clipping might occur without being indicated.

The scale: Between the indicators of the right and left channel there are little dots. These dots represent important volume values. In linear mode each dot is a 10% mark. In dbfs mode the dots represent the following values (from right to left): 0db, -3db, -6db, -9db, -12db, -18db, -24db, -30db, -40db, -50db, -60db.

4.3.3 The WPS Context Menu

Like the context menu for the File Browser, the WPS Context Menu allows you quick access to some often used functions:

Playlist

The Playlist submenu allows you to view, save, search and reshuffle the current playlist. To change settings for the Playlist Viewer press **F1** while viewing the playlist to bring up the Playlist Viewer Menu.

Playlist Viewer Menu

Show Icons. This toggles display of the icon for the currently selected playlist entry and the icon for moving a playlist entry

Show Indicies. This toggles display of the line numbering for the playlist

Track Display. This toggles between filename only and full path for playlist entries

Save Current Playlist. Allows the current playlist to be saved as a `.m3u` playlist file

Playlist catalog

View catalog. This lists all playlists that are part of the Playlist catalog. You can load a new playlist directly from this list.

Add to playlist. Adds the currently playing file to a playlist. Select the playlist you want the file to be added to and it will get appended to that playlist.

Add to new playlist. Similar to the previous entry this will add the currently playing track to a playlist. You need to enter a name for the new playlist first.

Sound Settings

This is a shortcut to the Sound Settings Menu, where you can configure volume, bass, treble, and other settings affecting the sound of your music. See section 6 (page 43) for more information.

Playback Settings

This is a shortcut to the Playback Settings Menu, where you can configure shuffle, repeat, party mode, study mode and other settings affecting the playback of your music.

Rating

The menu entry is only shown if Gather Runtime Information is enabled. It allows the asignment of a personal rating value (0 – 10) to a track which can be displayed in the WPS and used in the Database browser. Press **Right** to increment the value. The value wraps at 10.

Bookmarks

This allows you to create a bookmark in the currently-playing track.

Show Track Info

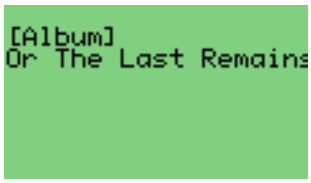

Figure 4.4: The track info viewer

This screen is accessible from the WPS screen, and provides a detailed view of all the identity information about the current track. This info is known as meta data and is stored in audio file formats to keep information on artist, album etc. To access this screen, press **F1** + **On**. Use **Left** and **Right** to move through the information.

Open With...

This Open With function is the same as the Open With function in the file browser's Context Menu.

Delete

Delete the currently playing file.

Pitch

The Pitch Screen allows you to change the pitch and (at the same time) the playback speed of your player. The pitch value can be adjusted between 50% and 200%. 50% means half the normal playback speed and the pitch that is an octave lower than the

normal pitch. 200% means double playback speed and the pitch that is an octave higher than the normal pitch. It is not possible to change the pitch without changing the playback speed and vice versa. Changing the pitch can be done in two modes: procentual and semitone. Initially (after the player is switched on), procentual mode is active.

Key	Action
F1	Toggle pitch changing mode
Up / **Down**	Increase / Decrease pitch by 0.1% (in procentual mode) or a semitone (in semitone mode)
Long **Up** / Long **Down**	Increase / Decrease pitch by 1% (in procentual mode) or a semitone (in semitone mode)
Right / **Left**	Temporarily increase / decrease pitch by 2.0%
On	Reset pitch to 100%
Off	Leave the Pitch Screen

Warning: Changing the pitch can cause audible 'Artifacts' or 'Dropouts'.

4.4 Quick Screens

Figure 4.5: The F2 quick screen

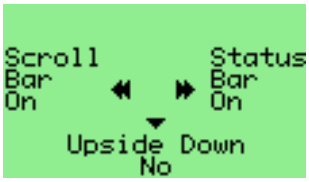

Figure 4.6: The F3 quick screen

Rockbox handles function buttons in a different way to the Archos software. **F1** is always bound to the menu function, while **F2** and **F3** enable two quick screens.

F2 displays some browse and play settings which are likely to be changed frequently. This settings are Shuffle mode, Repeat mode and the Show files options

Shuffle mode plays each track in the currently playing list in a random order rather than in the order shown in the browser.

Repeat mode repeats either a single track (One) or the entire playlist (All).

Show files determines what type files can be seen in the browser. This can be just MP3 files and directories (Music), Playlists, MP3 files and directories (Playlists), any files that Rockbox supports (Supported) or all files on the disk (All).

See section **??** (page **??**) for more information about these settings.

Key	Action
Left	Controls Shuffle mode setting
Right	Controls Repeat mode setting
Down	Controls Show file setting

F3 controls frequently used display options.

Scroll bar turns the display of the Scroll bar on the left of the screen on or off.

Status bar turns the status display at the top of the screen on or off. Upside down inverts the screen so that the top of the display appears nearest to the buttons. This is sometimes useful when storing the player in a pocket. Key assignments swap over with the display orientation where it is logical for them to do so.

See section 8.4 (page 51) for more information about these settings.

Key	Action
Left	Controls scroll bar display
Right	Controls status bar display
Down	Controls upside down screen setting

4.5 Working with Playlists

4.5.1 Playlist terminology

Some common terms that are used in Rockbox when referring to playlists:

Directory. A playlist! One of the keys to getting the most out of Rockbox is understanding that Rockbox *always* considers the song that it is playing to be part of a playlist, and in some situations, Rockbox will create a playlist automatically. For example, if you are playing the contents of a directory, Rockbox will automatically

create a playlist containing all songs in it. This means that just about anything that is described in this chapter with respect to playlists also applies to directories.

Dynamic playlist. A dynamic playlist is a playlist that is created "On the fly." Any time you insert or queue tracks using the Playlist submenu (see section 4.5.3 (page 34)), you are creating (or adding to) a dynamic playlist.

Insert. In Rockbox, to Insert an item into a playlist means putting an item into a playlist and leaving it there, even after it is played. As you will see later in this chapter, Rockbox can Insert into a playlist in several places.

Queue. In Rockbox, to Queue a song means to put the song into a playlist and then to remove the song from the playlist once it has been played. The only difference between Insert and Queue is that the Queue option removes the song from the playlist once it has been played, and the Insert option does not.

4.5.2 Creating playlists

Rockbox can create playlists in four different ways.

By selecting ("playing") a song from the File Browser

Whenever a song is selected from the File Browser with **Right**, Rockbox will automatically create a playlist containing all of the songs in that directory and start playback with the selected song.

Note: If you already have created a dynamic playlist, playing a new song will *erase* the current dynamic playlist and create a new one. If you want to add a song to the current playlist rather than erasing the current playlist, see the section below on how to add music to a playlist.

By using Insert and Queue functions

If playback is stopped, the Insert and Queue functions can be used as described in 4.5.3 to create a new playlist instead of adding to an existing one. This will *erase* any dynamic playlist.

By using the Playlist catalog

The Playlist catalog makes it possible to modify and create playlists that are not currently playing. To do this select Playlist catalog in the Context Menu. There you will have two choices, Add to playlist adds the selected track or directory to an existing playlist and Add to a new playlist creates a new playlist containing the selected track or directory.

Note: All playlists in the Playlist catalog are stored by default in the `/Playlists` directory in the root of your player's disk and playlists stored in other locations are not included in the catalog. It is however possible to move existing playlists there (see section 4.1.2 (page 21)).

By using the Main Menu

To create a playlist containing all music on your player, you can use the Create Playlist command in the Playlist Options menu found in the Main Menu. The created playlist will be named `root.m3u` and saved in the root of your player's disk.

4.5.3 Adding music to playlists

Adding music to a dynamic playlist

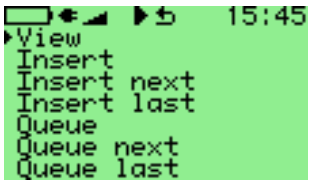

Figure 4.7: The Playlist Submenu

The Playlist Submenu is a submenu in the Context Menu (see section 4.1.2 (page 21)), it allows you to put tracks into a "dynamic playlist". If there is no music currently playing, Rockbox will create a new dynamic playlist and put the selected track(s) into it. If there is music currently playing, Rockbox will put the selected track(s) into the current playlist. The place in which the newly selected tracks are added to the playlist is determined by the following options:

Insert. Add track(s) immediately after any tracks added via the most recent Insert operation. If no tracks have yet been added via an Insert, new tracks will be added immediately after the current playing track. If playback is stopped a new dynamic playlist will get created with the selected tracks.

Insert Next. Add track(s) immediately after current playing track, no matter what else has been inserted.

Insert Last. Add track(s) to end of playlist.

Insert Shuffled. Add track(s) to the playlist in a random order.

Queue. Queue is the same as Insert except queued tracks are deleted immediately from the playlist after they have been played. Also, queued tracks are not saved to the playlist file (see section 5.9 (page 40)).

Queue Next. Queue track(s) immediately after current playing track.

Queue Last. Queue track(s) at end of playlist.

Queue Shuffled. Queue track(s) in a random order.

Play Next. Replaces all but the current playing track with track(s). Current playing track is queued.

The Playlist Submenu can be used to add either single tracks or entire directories to a playlist. If the Playlist Submenu is invoked on a single track, it will put only that track into the playlist. On the other hand, if the Playlist Submenu is invoked on a directory, Rockbox adds all of the tracks in that directory to the playlist.

Note: You can control whether or not Rockbox includes the contents of subdirectories when adding an entire directory to a playlists. Set the Settings → General Settings → Playlist → Recursively Insert Directories setting to Yes if you would like Rockbox to include tracks in subdirectories as well as tracks in the currently-selected directory.

Dynamic playlists are saved so resume will restore them exactly as they were before shutdown.

Note: To view, save or reshuffle the current dynamic playlist use the Playlist sub menu in the WPS context menu or in the Main Menu.

4.5.4 Modifying playlists

Reshuffling

Reshuffling the current playlist is easily done from the Playlist sub menu in the WPS, just select Reshuffle.

Moving and removing tracks

To move or remove a track from the current playlist enter the Playlist Viewer by selecting View Current Playlist in the Playlist submenu in the WPS context menu or the Main Menu. Once in the Playlist Viewer open the context menu on the track you want to move or remove. If you want to move the track, select Move in the context menu and then move the blinking cursor to the place where you want the track to be moved and confirm with **Right** or **On**. To remove a track, simply select Remove in the context menu.

4.5.5 Saving playlists

To save the current playlist either enter the Playlist submenu in the WPS Context Menu (see section 4.3.3 (page 29)) and select Save Current Playlist or enter the Playlist Options menu in the Main Menu and select Save Current Playlist. Either method will bring you to the Virtual Keyboard (see section 4.1.3 (page 23)), enter a filename for your playlist and accept it and you are done.

4.5.6 Loading saved playlists

Through the File Browser

Playlist files, like regular music tracks, can be selected through the File Browser. When loading a playlist from disk it will replace the current dynamic playlist.

Through the Playlist catalog

The Playlist catalog offers a shortcut to all playlists in your player's specified playlist directory. It can be used like the File Browser.

4.5.7 Helpful Hints

Including subdirectories in playlists

You can control whether or not Rockbox includes the contents of subdirectories when adding an entire directory to a playlists. Set the Main Menu → Settings → Playlist → Recursively Insert Directories setting to Yes if you would like to include tracks in subdirectories as well as tracks in the currently selected directory.

5 The Main Menu

5.1 Introducing the Main Menu

Figure 5.1: The main menu

The Main Menu is the screen from which all of the Rockbox functions can be accessed. This is the first screen you will see when starting Rockbox. To return to the Main Menu, press the **F1** button.

All settings are stored on the unit. However, Rockbox does not spin up the disk solely for the purpose of saving settings. Instead, Rockbox will save settings when it spins up the disk the next time, for example when refilling the MP3 buffer or navigating through the File Browser. Changes to settings may therefore not be saved unless the player is shut down safely (see section 3.1.2 (page 18)).

5.2 Navigating the Main Menu

Key	Action
Up	Moves up in the menu. Inside a setting, increases the value or chooses next option
Down	Moves down in the menu. Inside a setting, decreases the value or chooses previous option
Play/Right	Selects option
Off/Left	Exits menu, setting or moves to parent menu

5.3 Recent Bookmarks

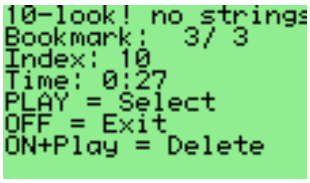

Figure 5.2: The list bookmarks screen

If the Save a list of recently created bookmarks option is enabled then you can view a list of several recent bookmarks here and select one to jump straight to that track. See section 8.6 (page 55) for more details on configuring bookmarking in Rockbox.
Note: This entry is not shown in the Main Menu when the option is off and the option is off by default.

5.4 Files

Browse the files on your player (see section 4.1 (page 20)).

5.5 Database

Browse by the meta-data in your audio files (see section 4.2 (page 23)).

5.6 Now Playing/Resume Playback

Go to the While Playing Screen and resume if music playback is stopped or paused and there is something to resume (see section 4.3 (page 26)).

5.7 Settings

The Settings menu allows to set or adjust many parameters that affect the way your player works. There are many submenus for different parameter areas. Every time you are setting a value of a parameter, and that value is selected from a list of some predefined available values, you can press Long **Play**, and the selection cursor will jump to the default value for the parameter. You can then confirm or cancel the value. This is useful if you have changed the value of the parameter from the default to some other value and would like to restore the default value.

5.7.1 Sound Settings

The Sound Settings menu offers a selection of sound properties you may change to customise your listening experience. The details of this menu are covered in section 6 (page 43).

5.7.2 Playback Settings

The Playback Settings menu allows you to configure settings related to audio playback. The details of this menu are covered in section 7 (page 47).

5.7.3 General Settings

The General Settings menu allows you to customise the way Rockbox looks and the way it plays music. The details of this menu are covered in section 8 (page 50).

5.7.4 Manage Settings

The Manage Settings option allows the saving and re-loading of user configuration settings, browsing the hard drive for alternate firmwares, and finally resetting your player back to initial configuration. This menu also allows the user to load different versions of the Rockbox firmware. The details of this menu are covered in section 12.3 (page 118).

5.7.5 Theme Settings

The Theme Settings menu contains options that control the visual apperance of Rockbox. The details of this menu are covered in section 9 (page 59).

5.7.6 Recording Settings

The Recording Settings menu allows you to configure settings related to recording. The details of this menu are covered in detail in section 10 (page 60).

5.8 Recording

5.8.1 While Recording Screen

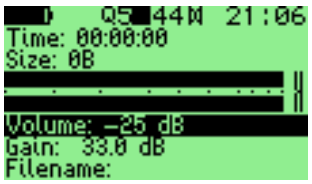

Figure 5.3: The while recording screen

Entering the Recording option in the Main Menu brings up a screen in which you can choose to enter the Recording Screen or the Recording Settings (see section 10 (page 60)). The Recording Screen shows the time elapsed and the size of the file being recorded. A peak meter is present to allow you set gain correctly. There is also a volume setting, this will only affect the output level of the player and does *not* affect the recorded sound. If enabled in the peak meter settings, a counter in front of the peak meters shows the number of times the clip indicator was activated during recording. The counter is reset to zero when starting a new recording. The frequency, channels and quality settings are shown on the last line.

The controls for this screen are:

Key	Action
Up / Down	Select setting.
Left / Right	Adjust selected setting.
Play	Start recording. While recording: pause recording (press again to continue).
Off	Exit Recording Screen. While recording: Stop recording.
F1	Open Recording Settings (see section 10 (page 60)).
F2	Quick menu for recording settings. A quick press will leave the screen up (press **F2** again to exit), while holding it will close the screen when you release it.
F3	Quick menu for source setting. Quick/hold works as for **F2**. While recording: Start a new recording file.

5.9 Playlist

This menu allows you to work with playlists. Playlists can be created in three ways. Playing a file in a directory causes all the files in it to be placed in a playlist. Playlists can be created manually by either using the Context Menu (see section 4.1.2 (page 21)) or using the Playlist menu. Both automatically and manually created playlists can be edited using this menu.

Create Playlist: Rockbox will create a playlist with all tracks in the current directory and all sub-directories. The playlist will be created one directory level "up" from where you currently are.

View Current Playlist: Displays the contents of the playlist currently stored in memory.

Save Current Playlist: Saves the current dynamic playlist, excluding queued tracks, to the specified file. If no path is provided then playlist is saved to the current directory.

Playlist Catalog: The Playlist Catalog provides a simple interface to maintain several playlists (see section 4.5 (page 32)).

5.10 Plugins

With this option you can load and run various plugins that have been written for Rockbox. There are a wide variety of these supplied with Rockbox, including several games, some impressive demos and a number of utilities. A detailed description of the different plugins is to be found in section 11 (page 64).

5.11 System

This option shows RAM buffer size, battery voltage level and estimated time remaining, disk total space and disk free space.

Time and Date: Time related menu options. Pressing Long **Play** will voice the current time if voice support is enabled

Set Time/Date: Set current time and date.

Sleep Timer: The Sleep Timer powers off your player after playing for a given time. It can be set from Off to 5 hours in 5 minute steps. The Sleep Timer is reset on boot.

Time Format: Choose 12 or 24 hour clock.

Rockbox Info: Displays some basic system information. This is, from top to bottom, the amount of memory Rockbox has available for storing music (the buffer). The battery status. Hard disk size and the amount of free space on the disk.

Version: Software version and credits display.

Debug (Keep Out!): This sub menu is intended to be used *only* by Rockbox developers. It shows hardware, disk, battery status and other technical information.

Warning: It is not recommended that users access this menu unless instructed to do so in the course of fixing a problem with Rockbox. If you think you have messed up your settings by use of this menu please try to reset *all* settings before asking for help.

5.12 Quick Screen

Whilst not strictly part of the Main Menu, it is worth noting that a few of the more commonly used settings are available from the Quick Screen. The Quick Screen

screen is accessed with **F2** and exited with **Play**. It allows rapid access to the Shuffle and Repeat modes (section **??** (page **??**)) and the Show Files option (section 8.2 (page 51)).

6 Sound Settings

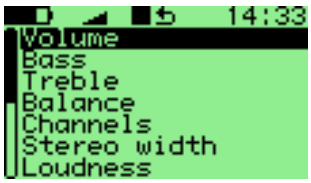

Figure 6.1: The sound settings screen

The sound settings menu offers a selection of sound settings you may change to customise your listening experience.

6.1 Volume

This setting adjusts the volume of your music. Like most professional audio gear and many consumer audio products, Rockbox uses a decibel scale where 0 dB is a reference that indicates the maximum volume that the player can produce without possible distortion (clipping). All values lower than this reference will be negative and yield a progressively softer volume. Values higher than 0 dB are available and can be used to raise the volume more than would otherwise be possible. These volume levels will ordinarily lead to distorted sound, but might work nicely for music that has an otherwise low volume level. The volume can be adjusted from a minimum of -100 dB to a maximum of +12 dB.

6.2 Bass

This setting emphasises or suppresses the lower (bass) frequencies in the sound. A value of 0 dB means that bass sounds are unaltered (flat response). The minimum setting is -12 dB and the maximum is 12 dB.

6.3 Treble

This setting emphasises or suppresses the higher (treble) frequencies in the sound. A value of 0 dB means that treble sounds are unaltered (flat response). The minimum setting is -12 dB and the maximum is 12 dB.

6.4 Balance

This setting controls the balance between the left and right channels. The default, 0, means that the left and right outputs are equal in volume. Negative numbers increase the volume of the left channel relative to the right, positive numbers increase the volume of the right channel relative to the left.

6.5 Channels

A stereo audio signal consists of two channels, left and right. The Channels setting determines if these channels are to be combined in any way, and if so, in what manner they will be combined. Available options are:

Setting	Description
Stereo	Leave the audio signal unmodified.
Mono	Combine both channels and send the resulting signal to both stereo channels, resulting in a monophonic output.
Custom	Allows you to manually specify a stereo width with the Stereo Width setting described later in this chapter.
Mono Left	Plays the left channel in both stereo channels.
Mono Right	Plays the right channel in both stereo channels.
Karaoke	Removes all sound that is common to both channels. Since most music is recorded with vocals being equally present in both channels to make the singer sound centrally placed, this often (but not always) has the effect of removing the voice track from a song. This setting also very often has other undesirable effects on the sound.

6.6 Stereo Width

Stereo width allows you to manually specify the effect that is applied when the Channels setting is set to "custom". All values below 100% will progressively mix the contents of one channel into the other. This has the effect of gradually centering the stereo image, until you have monophonic sound at 0%. Values above 100% will progressively remove components in one channel that is also present in the other. This has the effect of widening the stereo field. A value of 100% will leave the stereo field unaltered.

6.7 Loudness

When listening at low volumes, the ear will tend to make bass and treble frequencies sound quieter than they really are. To compensate for this, Loudness is an effect which emphasises bass and treble in a fashion suited to the human ear. Frequencies in the

vocal range are unaffected, since the human ear picks these up very easily at any sound level. It is of course also possible to use this effect at higher volumes for enhanced bass and treble.

6.8 Auto Volume

Auto volume is a feature that automatically lowers the volume on loud parts, and then slowly restores the volume to the previous level over a time interval. This setting allows this time interval to be configured. Short values like 20ms are useful for ensuring a constant volume for in-car use and other applications where background noise makes a constant loudness desirable. A longer timeout means that the change in volume back to the previous level will be smoother, so there will be fewer sharp changes in volume level.

6.9 Super Bass

This setting changes the threshold at which bass frequencies are affected by the Loudness setting, making the sound of drums and bass guitar louder in comparison to the rest of the sound. This setting only has an effect if Loudness is set to a value larger than 0dB.

6.10 MDB – Micronas Dynamic Bass

The rest of the parameters in this menu relate to the Micronas Dynamic Bass (MDB) function. MDB is designed to enable the user to hear bass notes that the headphones and/or speakers are not capable of reproducing. Every tone has a fundamental frequency (the "main tone") and also several harmonics, which are related to that tone. The human brain has a mechanism whereby it can actually infer the presence of bass notes from the higher harmonics that they would generate.

The practical upshot of this is that MDB produces a more authentic sounding bass by tricking the brain into believing it is hearing tones that the headphones or speakers are not capable of reproducing.

The MDB parameters are as follows:

MDB enable: This turns the MDB feature on or off. For many users this will be the only setting they need, since Rockbox picks sensible defaults for the other parameters. MDB is turned off by default.

MDB strength: How loud the harmonics generated by MDB will be.

MDB Harmonics: The percentage of the low notes that is converted into harmonics. If low notes are causing speaker distortion, this can be set to 100% to eliminate the fundamental completely and only produce harmonics in the signal. If set to 0% this is the same as turning the MDB feature off.

MDB Centre Frequency: The cutoff frequency of your headphones or speakers. This is usually given in the specification for the headphones/speakers.

MDB shape: It is recommended that this parameter be set to 1.5 times the centre frequency.

This is the frequency up to which harmonics are generated. Some of the lower fundamentals near the cut-off range will have their lower harmonics cut, since they will be below the range of the speakers. Fundamentals between the cut-off frequency and the lower frequency will have their harmonics proportionally boosted to compensate and restore the 'loudness' of these notes.

For most users, the defaults should provide an improvement in sound quality and can be safely left as they are. For reference, the defaults Rockbox uses are:

Setting	Value
MDB Strength	50dB
MDB Harmonics	48%
MDB Centre Frequency	60Hz
MDB Shape	90Hz

7 Playback Settings

The Playback Settings menu allows you to configure settings related to audio playback.

7.1 Shuffle

Turning shuffle on will cause Rockbox to randomly re-order the playlist. Thus, to shuffle all of the audio files on the player, you first need to create a playlist containing all of them. For more information on creating playlists refer to section 4.5 (page 32).
Options: Yes/No.

7.2 Repeat

Configures settings related to repeating of directories or playlists.
Options: Off / All / One / Shuffle / A-B:

Off The current playlist will not repeat when it is finished.

Note: If you have the Auto-Change Directory option set to Yes, Rockbox will move on to the next directory on your hard drive. If the Auto-Change Directory option is set to No, playback will stop when the current directory or playlist is finished.

All The current playlist will repeat when it is finished.

One Repeat one track over and over.

Shuffle When the current playlist has finished playing, it will be shuffled and then repeated.

A-B Repeats between two user defined points within a track, typically used by musicians when attempting to learn a piece of music. This option is more complicated to use than the others as the player must first be placed into A-B repeat mode and then the start and end points defined.

To set the Start Point (A) press **On** + **Right**. Setting the End Point (B) is done accordingly using **On** + **Left**. To reset the markers press **On** + **Off**.

7.3 Play Selected First

This setting controls what happens when you select a file for playback while shuffle mode is on. If the Play Selected First setting is Yes, the file you selected will be played first. If this setting is No, a random file in the directory will be played first.

7.4 Fast-Forward/Rewind

These settings control the speed and acceleration during fast forward and rewind. The setting FF/RW Min Step controls the initial speed and FF/RW Accel controls the acceleration.

7.5 Anti-Skip Buffer

This setting controls how early Rockbox starts refilling the music buffer from the hard drive when playing. A longer Anti-Skip Buffer helps prevent skips in music playback if Rockbox has trouble reading from the disk. This can happen if the player is knocked, shaken or jogged heavily while Rockbox is trying to read the hard drive.

The anti-skip buffer can be set to a value between 0 and 7 seconds.

Note: Having a large anti-skip buffer tends to use more power, and may reduce your battery life. It is recommended to always use the lowest possible setting that allows correct and continuous playback.

7.6 Fade on Stop/Pause

Enables and disables a fade effect when you pause or stop playing a song. If the Fade on Stop/Pause option is set to Yes, your music will fade out when you stop or pause playback, and fade in when you resume playback.

7.7 Party Mode

Enables unstoppable music playback. When new songs are selected, they are queued at the end of the current dynamic playlist instead of being played immediately. Pausing and stopping playback is disabled as well as skipping songs and launching plugins.

7.8 Auto-Change Directory

Control what Rockbox does when it reaches the end of a directory. If Auto-Change Directory is set to Yes, Rockbox will continue to the next directory. If Auto-Change Directory is set to No, playback will stop at the end of the current playlist. Using the Random feature requires you to first generate a folder list via the Random Folder Advance Configuration plugin (see section 11.4.13 (page 108)).

Note: You must have the Repeat option set to No for Auto-Change Directory to function properly.

Note: This feature only works when songs have been played from the file browser. Using it with the database may cause unexpected behavior.

7.9 Last.fm Log

Enables logging of your played tracks for submittal to http://www.last.fm. This service was formely known as *Audioscrobbler*. When you enable this option, you'll have to reboot to start the logging. The log-file is called `.scrobbler.log`,and is to be found in the root directory of your player.

Note: See ☞LastFMLog for a further description, and for tools you can use to submit your Last.fm log.

7.10 Cuesheet Support

Enables reading of cuesheet files for played tracks. If a cuesheet is found for a track, track markers are displayed on the progressbar and it is possible to skip between the tracks within the cuesheet. Also the information found in the cuesheet file will replace the information from the ID3 tags. When you enable this option, you'll have to reboot for it to come into effect.

7.11 Skip Length

Designed to speed up navigation and prevent unintentional track skipping when listening to long audio tracks, Skip Length changes the behavior of the **Left** and **Right** buttons so that they skip by a given number of minutes instead of skipping to a new track.

Note: To skip tracks with this setting set to a time interval, press Short **Left** + Long **Right** to go forward and Short **Right** + Long **Left** to go back.

8 General Settings

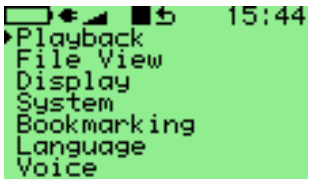

Figure 8.1: The general settings screen

8.1 Playlist

The Playlist sub menu allows you to configure settings related to playlists.

Recursively Insert Directories. If set to On, then when a directory is inserted or queued into a dynamic playlist, all subdirectories will also be inserted. If set to Ask, Rockbox will prompt the user about whether to include sub-directories.

Warn When Erasing Dynamic Playlist. If set to Yes, Rockbox will provide a warning if the user attempts to take an action that will cause Rockbox to erase the current dynamic playlist.

8.2 File View

The File View menu deals with options relating to how the File Browser displays files.

Sort Case Sensitive: If this option is set to Yes, all files that start with upper case letters will be listed first, followed by all files that begin with lower case letters. If this option is set to NO, then case will be ignored when sorting files.

Sort Directories: This option controls how Rockbox sorts directories. The default is to sort them alphabetically. By date sorts them with the oldest directory first. By newest date sorts them with the newest directory first.

Sort Files: This option controls how Rockbox sorts files. All of the options for Sort Directories are available in this option. In addition, there is a By type option which sorts files alphabetically by their type (such as `.mp3`) then alphabetically within each type.

Show Files: This option controls which files are displayed in the File Browser.

All: The File Browser displays all files and directories. Extensions are shown. No files or directories are hidden.

Supported: The File Browser displays all directories and files supported by Rockbox (see section A.1 (page 124)). Files and directories starting with . (*dot*) or with the *hidden* flag set are hidden.

Music: The File Browser displays only directories, playlists and the supported *audio* file formats. Extensions are stripped. Files and directories starting with . or with the "hidden" flag set are hidden.

Playlists: The File Browser displays only directories and playlists, for simplified navigation.

Show Filename Extensions: This option controls how file extensions are shown in the File Browser.

Off: The file extensions are never shown.

On: The file extensions are always shown.

Only unknown types: Only the extensions of unknown filetypes are shown.

Only when viewing all types: Only show file extensions when Show Files is set to All.

Follow Playlist: This option determines what directory the File Browser displays first. If Follow Playlist is set to Yes, when you enter the File Browser from the WPS, you will find yourself in the same directory as the currently playing file. If Follow Playlist is set to No, when you enter the File Browser from the WPS, you will find yourself in the directory you were in when you last left the File Browser.

Show Path: If this setting is set to Full Path the full path to the current directory will be displayed on the first line in the File Browser. If set to Current Directory Only only the name of the current directory will be displayed.

This has a similar effect on the Database browser. If set to Current Directory Only or Full Path, then the title of each menu will be displayed on the first line in the Database Browser.

8.3 Database

This sub menu allows you to configure the database. See section 4.2 (page 23) for more information about using the database.

8.4 Display

LCD Settings: This sub menu contains settings that relate to the display of the player.

Backlight: The amount of time the backlight shines after a key press. If set to Off, the backlight will not light when a button is pressed. If set to On, the backlight will never shut off. If set to a time (1 to 90 seconds), the backlight will stay lit for that amount of time after a button press.

Backlight (While Plugged In): This setting is equivalent to the Backlight setting except it applies when the player is plugged into the charger.

Backlight on Hold: This setting controls the behavior of the backlight when the Hold switch is toggled. If set to Normal the backlight will behave as usual. If set to Off the backlight will be turned off immediately when the Hold switch is engaged and if set to On the backlight will be turned on and stay on while the Hold switch is engaged.

Caption Backlight: This option turns on the backlight a number of seconds before the start of a new track, and keeps it on for the same number of seconds after the beginning so that the display can be read to see song information. The amount of time is determined by the value of the backlight timeout setting, but is no less than 5 seconds.

First Keypress Enables Backlight Only: With this option enabled the first keypress while the backlight is turned off will only turn the backlight on without having any other effect. When disabled the first keypress will *also* perform its appropriate action.

Contrast: Changes the contrast of your LCD display.

Warning: Setting the contrast too dark or too light can make it hard to find this menu option again!

LCD Mode: This setting lets you invert the colours of the display.

Upside Down: Displays the screen so that the top of the display is nearest the buttons. This is sometimes useful when carrying the player in a pocket for easy access to the headphone socket.

Scrolling This feature controls how text will scroll in Rockbox. You can configure the following parameters:

Scroll Speed: Sets how many times per second the automatic horizontal scrolling text will move a step.

Scroll Start Delay: Controls how many milliseconds Rockbox should wait before a new text begins automatically scrolling.

Scroll Step Size: Defines the number of pixels the text should move for each step, as used by the Scroll Speed setting.

Bidirectional Scroll Limit: Rockbox has two different automatic horizontal scrolling methods: 1) always scrolling the text to the left until the line has ended and then beginning again at the start, and 2) moving to the left until you can read the end of the line and then scrolling right until you see the beginning again. Rockbox chooses which method it should use depending of how much it has to scroll to the left. This setting lets you tell Rockbox where that limit is, expressed in percentage of the line length.

Screen Scrolls Out of View: Screens can be manually scrolled horizontally by pressing **On+Right/Left** . Setting this option to Yes will keep the list entries at their fixed positions and allow them to be scrolled out of view, whereas No will only scroll those entries which surpass the right margin.

Screen Scroll Step Size: Defines the number of pixels the horizontal manual screen scroll should move for each step.

Paged Scrolling: When set to Yes scrolling vertically on pages that surpass the screen size will page up/down instead of simply changing lines. This can be useful on slow displays.

Status/Scrollbar: Settings related to on screen status display and the scrollbar.

Scroll Bar: Enables or disables the scroll bar at the left.

Status Bar: Enables or disables the status bar at the upper side.

Button Bar: Enables or disables the button bar prompts for the "F"-keys at the bottom of the screen.

Volume Display: Controls whether the volume is displayed as a graphic or a numeric value on the Status Bar. If you select a numeric display, volume is displayed in decibels. See section 6.1 (page 43) for more on the volume setting.

Battery Display: Controls whether the battery charge status is displayed as a graphic or numerical percentage value on the Status Bar.

Peak Meter: The peak meter can be configured with a number of parameters.

Peak Release: This determines how fast the bar shrinks when the music becomes softer. Lower values make the peak meter look smoother. Expressed in scale units per 10ms.

Peak Hold Time: Specifies the time after which the peak indicator will reset. For example, if you set this value to 5s, the peak indicator displays the loudest volume value that occurred within the last 5 seconds. Larger values are useful if you want to find the peak level of a song, which might be of interest when copying music from the player via the analogue output to some other recording device.

Clip Hold Time: The number of seconds that the clipping indicator will be visible after clipping is detected.

Clip Counter: Show the number of times the clip indicator went active during recording in front of the peak meters.

Scale: Select whether the peak meter displays linear or logarithmic values. The human ear perceives loudness on a logarithmic scale. If the Scale setting is set to Logarithmic (dB) scale, the volume values are scaled logarithmically. The volume meters of digital audio devices usually are scaled this way. On the other hand, if you are interested in the power level that is applied to your headphones you should choose Linear display. This setting cannot

be displayed in units like volts or watts because such units depend on your headphones.

Minimum and maximum range: These two options define the full value range that the peak meter displays. Recommended values for the Logarithmic (dB) setting are -40 dB for minimum and 0 dB for maximum. Recommended values for Linear display are 0 and 100%. Note that -40 dB is approximately 1% in linear value, but if you change the minimum setting in linear mode slightly and then change to the dB scale, there will be a large change. You can use these values for 'zooming' into the peak meter.

Default Codepage: A codepage describes the way extended characters that are not available within the ASCII character set are encoded. ID3v1 tags do not have a codepage encoding contained so Rockbox needs to know what encoding has been used when generating these tags. This should be "ISO-8859-1" but to support languages outside Western Europe most applications use the setting of your operating system instead. If your operating system uses a different codepage and you are getting garbled extended characters you should adjust this settings. In most cases sticking to "ISO-8859-1" would be sufficient.

8.5 System

8.5.1 Start Screen

Set the screen that Rockbox will start in. Selecting Resume Playback will resume playback where it was when the player was shut off if there is a playlist to resume and will then end up in the WPS. Selecting Previous Screen will make Rockbox start in the screen it was when the player was shut off.

8.5.2 Battery

Options relating to the batteries in the player.

Battery Capacity: This setting can be used to tell Rockbox what capacity (in mAh) the battery being used has. The default is 1500mAh, which is the capacity value for the standard batteries shipped with the player. Rockbox uses this value to estimate remaining battery life for the info screen and WPS. Changing this setting has no effect whatsoever on actual battery life. This setting only affects the accuracy of the battery life estimation as shown on screen.

8.5.3 Disk

Options relating to the hard disk.

Disk Spindown: Rockbox has a timer that makes it spin down the hard disk after it is idle for a certain amount of time. This setting controls the amount of time between

the last user activity and the time that the disk spins down. This idle time is only affected by user activity, like navigating through the File Browser. When the hard disk spins up to fill the audio buffer, it automatically spins down afterwards.

8.5.4 Idle Poweroff

Rockbox can be configured to turn off power after the unit has been idle for a defined number of minutes. The player is idle when playback is stopped or paused. It is not idle while the USB or charger is connected , or while recording. Settings are either Off or 1 to 10 minutes in 1 minute steps. Then 15,30,45 and 60 minutes are available.

8.5.5 Limits

This sub menu relates to limits in the Rockbox operating system.

Max Entries in File Browser: This setting controls the limit on the number of files that you can put in any particular directory in the file browser. You can configure the size to be between 50 and 10,000 files in steps of 50. The default is 400. Higher values will shorten the music buffer, so you should increase this setting *only* if you have directories with a large number of files.

Max Playlist Size: This setting controls the maximum size of a playlist. The playlist size can be between 1,000 and 32,000 files, in steps of 1,000 (default is 10,000). Higher values will shorten the music buffer, so you should increase this setting *only* if you have very large playlists.

8.5.6 Car Adapter Mode

This option turns On and Off the car ignition auto stop function.

Car Adapter Mode: When using the player in a car, Car Adapter Mode automatically stops playback on the player when power (i.e. from cigarette lighter power adapter) to the external DC in jack is turned off. If the Car Adapter Mode is set to On, Rockbox will pause playback when the external power off condition is detected. Rockbox will then shutdown the player after the length of time set in the Idle Poweroff setting (see above). If power to the DC in jack is turned back on before the *Idle Poweroff* function has shut the player off, playback will be resumed 5 seconds after the power is applied. This delay is to allow for the time while the car engine is being started.

Once the player is shut off either manually, or automatically with the Idle Poweroff function, it must be powered up manually to resume playback.

8.6 Bookmarking

Bookmarks allow you to save your current position within a track so that you can return to it at a later time. Bookmarks are saved on a per directory basis (for dynamic playlists)

or for individual (saved) playlists. They are stored next to the directory/playlist they reference. You can store multiple bookmarks for the same track.

Bookmark on Stop. This option controls whether Rockbox writes a bookmark to the disk when playback is stopped. Setting this to No turns automatic bookmarking completely off. In contrast Yes turns automatic bookmarking on while Ask asks on stopping the track if a bookmark should be created. With the above options Yes and Ask if there is an existing `.bmark` file the current position information will be added to the front of the existing list, up to the maximum number of allowed bookmarks per file (currently 10). If no `.bmark` file exists, one will be created with the new bookmark information. Finally, if the Maintain a list of Recently Used Bookmarks option is enabled, the bookmarking information will be added to recent bookmarks list.

Yes – Recent Only. Turns on automatic bookmarking – One bookmark only

Ask – Recent Only. Asks if a bookmark should be created when stopping track – One bookmark only

With the two Recent Only options, nothing is written to the `.bmark` file. If the Maintain a list of Recently Used Bookmarks option is enabled, the bookmarking information will however be added to recent bookmarks list.

Note: The Resume function remembers your position in the most recently accessed track regardless of how the Bookmark on Stop option is set.

Load Last Bookmark. When the Load Last Bookmark option is set to Yes, Rockbox automatically returns to the position of the last bookmark within a file when that file is played.

When the Load Last Bookmark option is set to Ask, Rockbox will give the user the option of starting from the beginning of the track of or from the bookmark.

When the Load Last Bookmark option is set to No, playback always starts from the beginning of the track, and the user must play the bookmark or use the Load Bookmark function in the Main Menu, while the file is playing, to resume at the bookmarked location.

Maintain a list of Recently Used Bookmarks. This list of Most Recent Bookmarks (MRB's) may be accessed through the Recent Bookmarks option of the Bookmarks sub menu of the Main Menu. When set to Yes each new bookmark will be added to the MRB list. Setting this to No disables the addition of bookmarks to the MRB list. Unique Only behaves like the Yes setting but in addition all older entries for the current (dynamic) playlist will be removed from the MRB whenever a new entry is added.

Bookmark Actions context menu. When viewing any bookmark list, pressing the standard context menu key (Long **Play**) will bring up the Bookmark Actions context menu.

Resume will commence playback of the currently-selected bookmark entry.

Delete will remove just the currently-selected bookmark entry from the list.

8.7 Language

This setting controls the language of the Rockbox user interface. Selecting a language will activate it. The language files must be in the `/.rockbox/langs/` directory. See section 12.1.3 (page 114) for further details about languages.

8.8 Voice

Voice Menus. This option controls the voicing of menus/settings as they are selected by the cursor. In order for this to work, a voice file must be present in the `/.rockbox/langs/` directory on the player. Voice files are large and are not shipped with Rockbox by default. The voice file is the name of the language for which it is made, followed by the extension `.voice`. So for English, the file name would be `english.voice`. This option is on by default, but will do nothing unless the appropriate voice file is installed in the correct place on the player. The Voice Menus have several limitations:

- Setting the Sound Option Channels to Karaoke may disable voice menus.
- Plugins and the wake up alarm do not support voice features.

Voice Directories. This option controls voicing of directory names. A voice file must be present for this to work. Several options are available.

Spell. Speak the directory name by spelling it out letter by letter. Support is provided only for the most common letters, numbers and punctuation.

Numbers. Each directory is assigned a number based upon its position in the file list. They are then announced as "Directory 1", "Directory 2" etc.

Off. No attempt will be made to speak directory names.

You can use pre-generated .talk clips to have directory names spoken properly, but you must enable this explicitly (see below).

Use Directory .talk Clips. This option turns on the use of .talk clips for directories.

On. Use special pre-recorded MP3 files (`_dirname.talk`) in each directory. These must be generated in advance, and are typically produced synthetically using a text-to-speech engine on a PC.

Off. No checking is made for directory .talk clips; they are not used even if present. This can reduce disk activity.

Use of a .talk clip takes precedence over other directory name voicing. Otherwise (e.g. if a .talk clip is not available), voicing uses the method set under Voice Directories above.

Voice Filenames. This option controls voicing of filenames. Again, a voice file must be present for this to work. The options provided are Spell, Numbers, and Off which function the same as for Voice Directories. You can use pre-generated .talk clips to have filenames spoken properly, but you must enable this explicitly (see below).

Use File .talk Clips. This option turns on the use of .talk clips for files.

On. Use special pre-recorded MP3 files for each file. This functions the same as for directories except that the .talk clip file must have the same name as the described file with an extra .talk extension (e.g. `Punkadiddle.mp3` would require a file called `Punkadiddle.mp3.talk`).

Off. No checking is made for file .talk clips; they are not used even if present. This can reduce disk activity.

Use of a .talk clip takes precedence over other filename voicing. Otherwise (e.g. if a .talk clip is not available), voicing uses the method set under Voice Filenames above.

Say File Type. This option turns on voicing of file types when Voice Filenames is set to Spell or Numbers. When Voice Directories is set to Spell, "Directory" will be voiced after each spelled out directory.

Announce Battery Level. When this option is enabled the battery level is announced when it falls under 50%, 30% and 15%.

See ☞VoiceHowto for more details on configuring speech support in Rockbox.

9 Theme Settings

The Theme Settings menu offers options that you can change to customize the visual apperance of Rockbox.

Browse Themes. This option will display all the currently installed themes on the player, press **Right** to load the chosen theme and apply it.

A theme is a configuration file, stored in a specific directory, that typically changes the WPS , font used and on some platforms additional information such as background image and text colours.

There are a number of themes that ship with Rockbox. If none of these suit your needs, many more can be downloaded from ☞WpsArchos. Some of the downloads from this website will actually be standalone WPS files, others will be full-blown themes.

Note: Themes do not have to be purely visual. It is quite possible to create a theme that switches between audio configurations for use in the car, with headphones and when connected to an external amplifier. See section 12.2.2 (page 115) for more details.

Browse Fonts. Browse the installed fonts on your player. Selecting one will activate it. See section 12.1.2 (page 114) for further details about fonts.

Browse WPS files. Opens the File Browser in the `/.rockbox/wps` directory and displays all `.wps` files. Selecting one will activate it, stop will exit back to the menu. For further information about the WPS see section 4.3 (page 26). For information about editing a .wps file see section 12.2 (page 114).

Show Icons. Rockbox has the ability to display an icon to the left of the file in the File Browser. For details of these icons, see section A.1 (page 124). These icons can also be customised. See the ☞IconSets and ☞CustomIcons Wiki pages for details.

Line Selector Type. This option allows you to select which type of line selector to use.

Pointer: A small arrow to the left of the menu text.

Bar (inverse): A bar with inverted foreground and background colour.

10 Recording Settings

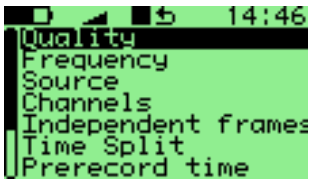

Figure 10.1: The recording settings screen

Note: To change the location where recordings are stored open the Context Menu (see section 4.1.2 (page 21)) on the directory where you want to store them in the File Browser and select Set As Recording Directory.

10.1 Quality

Choose the quality here (0 to 7). Default is 5, best quality is 7, smallest file size is 0. This setting effects how much your sound sample will be compressed. Higher quality settings result in larger MP3 files.

The quality setting is just a way of selecting an average bit rate, or number of bits per second, for a recording. When this setting is lowered, recordings are compressed more (meaning worse sound quality), and the average bitrate changes as follows.

Frequency	*Bitrate* (Kbit/s) – quality 0→7
44100Hz stereo	75, 80, 90, 100, 120, 140, 160, 170
22050Hz stereo	39, 41, 45, 50, 60, 80, 110, 130
44100Hz mono	65, 68, 73, 80, 90, 105, 125, 140
22050Hz mono	35, 38, 40, 45, 50, 60, 75, 90

10.2 Frequency

Choose the recording frequency (sample rate). 48kHz, 44.1kHz, 32kHz, 24kHz, 22.05kHz, 16kHz are available. Higher sample rates use up more disk space, but give better sound quality. The frequency setting also determines which version of the MPEG standard

the sound is recorded using:
MPEG v1 for 48, 44.1 and 32
MPEG v2 for 24, 22.05 and 16

Note: You cannot change the sample rate for digital recordings.

10.3 Source

Choose the source of the recording. The options are: SPDIF (digital), Mic, and Line In.

10.4 Channels

This allows you to select mono or stereo recording. Please note that for mono recording, only the left channel is recorded. Mono recordings are usually somewhat smaller than stereo.

10.5 Independent Frames

The independent frames option tells the player to encode with the bit reservoir disabled, so the frames are independent of each other. This makes a file easier to edit.

10.6 File Split Options

This sub menu contains options for file splitting, which can be used to split up long recordings into manageable pieces. The splits are seamless (frame accurate), no audio is lost at the split point. The break between recordings is only the time required to stop and restart the recording, on the order of 2 – 4 seconds.

Split Measure: This option controls wether to split the recording when the Split Filesize is reached or when the Split Time has elapsed.

What to do when Splitting: This controls what will happend when the splitting condition is fullfilled the two available options here are Start a new file or Stop recording.

Split Time: Set the time to record between each split, if time is used as Split Measure. Options (hours:minutes between splits): Off, 00:05, 00:10, 00:15, 00:30, 1:00, 1:14 (74 minute CD), 1:20 (80 minute CD), 2:00, 4:00, 8:00, 10:00, 12:00, 18:00, 24:00.

Split Filesize: Set the filesize to record between each split, if filesize is used as Split Measure.

10.7 Prerecord Time

This setting buffers a small amount of audio so that when the record button is pressed, the recording will begin from that number of seconds earlier. This is useful for ensuring that a recording begins before a cue that is being waited for.

10.8 Clear Recording Directory

Resets the location where the recorded files are saved to the root of your player's drive.

10.9 Clipping Light

Causes the backlight to flash on when clipping has been detected.
Options: Off, Main unit only, Main and remote unit, Remote unit only.

10.10 Trigger

When you record a source you often are only interested in the sound and not the silence in between. The recording trigger provides you with a tool to automatically distinguish between sound and silence and record the sound only. Unfortunately it is not very easy to make this distinction between silence and sound because you hardly ever encounter real silence. There always are background noises. What is considered as background noise depends on the situation. For example during a lecture the very low noise of rustling paper might be considered as background noise. During a rock concert the murmur of the audience might be concidered background noise which is much louder compared to rustling paper. Also the duration of the signal matters. When you record speech you want to record every syllable. When you record live music you may not be interested in that chord the guitarist strokes for two minutes before the show to verify his amp is turned on. The trigger features numerous parameters to adapt its behaviour to the desired situation.

Trigger This parameter specifies the trigger mode. When set to Off the recording must be started manually and apart from the Prerecord time no other parameter has any effect. Once will have the trigger start one recording only; after the recording has finished the input signal will not start another recording. Repeat will have the trigger start multiple recordings.

Trigtype **Add description of Trigtype** Options: Stop, Pause, New File.

Prerecord Time This specifies the time that is included into the recording before the trigger event occurs. This is very useful if you record a signal that fades in. Usually you want to set the prerecord time ¿= start duration. That ensures that you record the entire sound. Strictly speaking the prerecord time is not a special parameter of the trigger. It is available during normal recordings too.

Start Above The start threshold defines the minimal volume a sound must have to start the recording. It is displayed numerically in the line "Start Above". Note that the unit of the threshold depends on the settings of the peak meter. (i.e. When the peak meter displays db you can adjust the level in db and when the peak meter is set to linear the threshold is displayed as percentage.) In the peak meter at the bottom of the screen the start threshold is displayed graphically by a little triangle pointing to the right. There are two special values. The value Off turns the start condition off. With this setting you have to start the recording manually and the trigger only stops the recording according to the stop condition. The setting -inf sets the trigger to the absolute minimum. This setting only makes sense when you record via a digital input as even the noise of the device itself would exceed this threshold immediately.

for at least The start duration defines the minimal duration that a signal must exceed the start threshold to start the recording. Depending on your situation you may want to set this setting to 0 (e.g. when copying a song from a commercial medium) or to quite big values. Because sound is not continuous by nature (think of percussion) neglectable dropouts are tolerated during this start duration.

Stop Below When the sound level drops below the stop threshold the recording is stopped. It is displayed numerically in the line "Stop Below". Just like the start threshold the unit of the stop threshold depends on the settings of the peak meter. There's also a small triangular marker in the peak meter at the bottom of the screen. In contrast to the start threshold marker it points to the left. The value Off turns the stop condition off. With this setting you have to stop the recording manually.

for at least This time specifies the duration the signal must drop below the stop threshold to stop the recording. By selecting high values you can ensure that, for example, trailing fade-outs are recorded entirely.

Presplit Gap When the signal drops below the stop threshold for the time specified by the presplit gap a new recording may be started when the signal raises above the start threshold. Thus the value of the presplit gap should be smaller than the stop hold time. Otherwise the recording would stop anyway and the presplit gap has no effect. For most uses I recommend to set this parameter equal to the stop hold time. Sometimes you may encounter a sound source (e.g. a CD) where the songs have fade outs and hardly any gaps between the tracks. Here you can set the stop hold time to long values to ensure that all fade outs are recorded completely. By specifying a short presplit gap you still can split the recording into seperate tracks whenever the trigger start condition is met.

More information can be found at ☞VolumeTriggeredRecording.

11 Plugins

Plugins are programs that Rockbox can load and run. Only one plugin can be loaded at a time. Plugins have exclusive control over the user interface. This means you cannot switch back and forth between a plugin and Rockbox. When a plugin is loaded, you need to exit it to return to the Rockbox interface. Most plugins will not interfere with music playback but some of them will stop playback while running. Plugins have the file extension `.rock`. Most of them can be started from Browse Plugins in the Main Menu.

Viewer plugins get started automatically by opening an associated file (i.e. text files, chip8 games), or from the Open with option on the Context Menu.

11.1 Games

See also the Chip-8 emulator in section 11.3.2 (page 91) and Rockboy in section 11.3.6 (page 93).

11.1.1 Blackjack

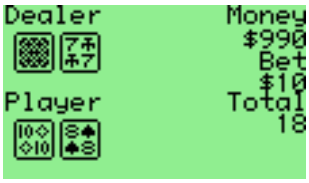

Figure 11.1: Blackjack

Blackjack, a game played in casinos around the world, is now available in the palm of your hand! The rules are simple: try to get as close to 21 without going over or simply beat out the dealer for the best hand. Although this may not seem difficult, blackjack is a game renowned for the strategy involved. This version includes the ability to split, buy insurance, and double down.

For the full set of rules to the game, and other facinating information visit
http://www.blackjackinfo.com/blackjack-rules.php

Key	Action
	In menu
On	Start new game
Play	Resume saved game
Right	Show high scores
Off	Quit
	In game
Left / Right / Up / Down	Enter betting amount
F1	Hit (Draw new card)
F2	Stay (End hand)
F3	Double down
Play	Save game
Off	Return to menu or cancel

11.1.2 BrickMania

Figure 11.2: BrickMania

BrickMania is a clone of the classic game Breakout. The aim of the game is to destroy all the bricks by hitting them with the ball once or more. Sometimes a special item falls down when you destroy a brick. For a special item to take effect, you must catch it with the paddle. Look out for the bad ones.

Special items

Displayed	Name	Description
N	Normal	Returns paddle to normal.
D	Die	Ball dies; lose a life.
L	Life	Gain a life.
F	Fire	Allows you to shoot bricks with paddle.
G	Glue	Ball sticks to paddle each time it hits.
B	Ball	Immediately fires another ball.
FL	Flip	Flip left / right movement.

Key	Action
Left / Right	Moves the paddle
Play / Up	Release the ball / Fire
Off	Open menu / Quit

11.1.3 Bubbles

Figure 11.3: Bubbles

The goal of the game is to beat each level as quickly as possible by clearing the board of all bubbles. Bubbles are removed from the board when a cluster of three of more of the same type is formed. The game is over when any bubbles on the board extend below the bottom line. To make things more difficult, the entire board is shifted down every time a certain number of shots have been fired. Points are awarded depending on how quickly the level was completed.

Key	Action
On	Pause game
Left / Right	Aim the bubble
Play	Fire bubble
F1	Save game
Off	Exit to menu

11.1.4 Chessbox

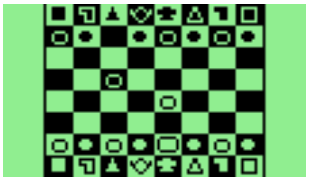

Figure 11.4: Chessbox

Chessbox is a one-person chess game with computer artificial intelligence. The chess engine is a port of GNU Chess 2 by John Stanback.

It also works as a PGN file viewer. Instead of executing the game from the plugin menu, look for any file with `.pgn` extension in the file browser and execute it. Chessbox will show the list of matches included in the file and allow you to select the one you want to watch. After that, you can scroll back and forth through the moves of the game. If the menu is invoked while in the viewer, the user is allowed to select a new match from the same file or quit the game.

"Force play" while the computer is thinking will cause it to make its move immediately. If done while it's your turn, the computer will move for you and flip the board so that you are playing from the other side. If you want, you can force play an entire game and watch the artificial intelligence fight against itself.

When you quit the game the current state will be saved and restored when you resume the game. The menu also allows the user to reload the last game saved, save the current position and start a new game without having to quit the game.

Note: This plugin will stop playback.

Keys

Key	Action
Direction keys	Move the cursor
Play	Pick up / Drop piece
F1	Change level
On	Force play
Off	Show the menu

11.1.5 Chopper

Navigate a cavernous maze without banging into walls, the ceiling, or the floor. How long can you fly your chopper?

Key	Action
Play	Make chopper fly
Off	Enter menu

11.1.6 Dice

Dice is a simple dice rolling simulator. Select number and type of dice to roll in a menu and start by choosing "Roll Dice". The result is shown as individual numbers as well as the total of the rolled dice.

Key	Action
On	Roll dice again
Off	Quit

11.1.7 Flipit

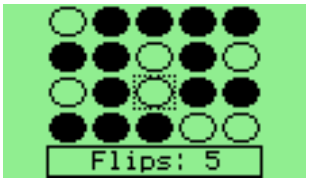

Figure 11.5: Flipit

Flipping the colour of the token under the cursor also flips the tokens above, below, left and right of the cursor. The aim is to end up with a screen containing tokens of only one colour.

Key	Action
Up / **Down** / **Left** / **Right**	Move the cursor
Play	Flip
F1	Shuffle
F2	Solve
F3	Solve step by step
Off	Quit the game

11.1.8 Jewels

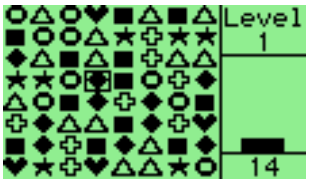

Figure 11.6: Jewels

Jewels is a simple yet addicting game which involves swapping pairs of jewels in order to form connected segments of three or more of the same type.

The goal of the game is to score as many points as possible before running out of available moves. Higher points are awarded to larger combos. The game advances to the next level after every one hundred points and randomly clears several jewels.

Key	Action
Left/**Right**/ **Up**/**Down**	Move the cursor around the jewels
Play	Select a jewel
Long **Play**	Show the in-game menu
Off	Exit

11.1.9 MazezaM

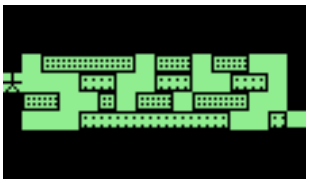

Figure 11.7: MazezaM

The goal of this puzzle game is to escape a dungeon consisting of ten "mazezams". These are rooms containing rows of blocks which can be shifted left or right. You can move the rows only by pushing them and if you move the rows carelessly, you will get stuck. You can have another go by selecting "retry level" from the menu, but this will cost you a life. You start the game with three lives. Luckily, there are checkpoints at levels four and eight.

Key	Action
Up, **Down**, **Left**, **Right**	Move Character
Off	Menu

11.1.10 Minesweeper

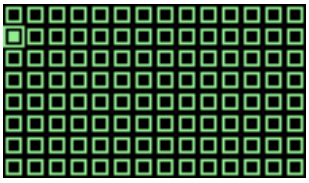

Figure 11.8: Minesweeper plugin

The classic game of minesweeper. Use the **Up** and **Down** keys to select the required percentage of mines to set the difficulty then press the **On** key to begin.

The aim of the game is to uncover all of the squares on the board. If a mine is uncovered then the game is over. If a mine is not uncovered, then the number of mines adjacent to the current square is revealed. The aim is to use the information you are given to work out where the mines are and avoid them. When the player is certain that they know the location of a mine, it can be tagged to avoid accidentally "stepping" on it.

Key	Action
Up / **Down** / **Left** / **Right**	Move the cursor across the minefield
F1/**On**	Toggle flag on / off
F2/**Play**	Reveal the contents of the current square
F3	Display the current game status
Off	Exit the game

11.1.11 Pegbox

Figure 11.9: pegbox

To beat each level, you must destroy all of the pegs. If two like pegs are pushed into each other they disappear except for triangles which form a solid block and crosses which allow you to choose a replacement block.

Key	Action
	In game
Up, **Down**, **Left**, **Right**	to move around
On	to select/save
F2	to restart level
F1	to go up a level
F3	to go down a level
Off	to quit

11.1.12 Pong

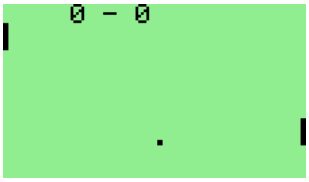

Figure 11.10: Pong

Pong is a simple two player "tennis game". Whenever a player misses the ball the other scores.

Key	Action
F1	Left player up
Left	Left player down
F3	Right player up
Right	Right player down
Off	Quit

11.1.13 Robotfindskitten

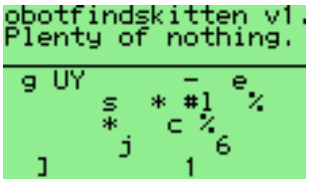

Figure 11.11: Robotfindskitten

In this game, you are robot (#). Your job is to find kitten. This task is complicated by the existence of various things which are not kitten. Robot must touch items to determine if they are kitten or not. The game ends when robotfindskitten.

Key	Action
Up, **Down**, **Left**, **Right**	Move robot
Off	Quit

11.1.14 Rockblox

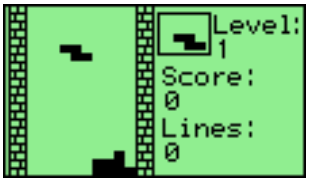

Figure 11.12: Rockblox

Rockblox is a rockbox version of the classic falling blocks game. The aim of the game is to make the falling blocks of different shapes form full rows. Whenever a row is complete it will be cleared and the game score will increase. For every ten lines completed the game level increases, making the blocks fall faster. If the pile of blocks reach the ceiling the game is over.

Key	Action
F1	Restart game
Left	Move left
Right	Move right
Down	Move down
Play	Rotate left
Up	Rotate right
On	Drop
Off	Quit

11.1.15 Rockblox1d

Rockblox1d is a game for people who find rockblox too hard. In this version the second dimension is missing so the user only has to move the bricks down. No horizontal moving anymore and no need to rotate the brick!

Key	Action
Play	Move down faster
Off	Quit

11.1.16 Sliding Puzzle

Figure 11.13: Sliding puzzle

The classic sliding puzzle game. Rearrange the pieces so that you can see the whole picture, or switch to number tiles if you like it a little easier

Key controls:

Key	Action
Left, **Right**, **Up** and **Down**	Move Tile
F1	Shuffle
F2	Change between picture and numbered tiles
Off	Stop the game

11.1.17 Snake

Figure 11.14: Snake

This is the popular snake game. The aim is to grow your snake as large as possible by eating the dots that appear on the screen. The game will end when the snake touches either the borders of the screen or itself.

Key	Action
Up/Down	Change levels (1 is slowest, 9 is fastest)
Play	Toggle Play/Pause

11.1.18 Snake 2

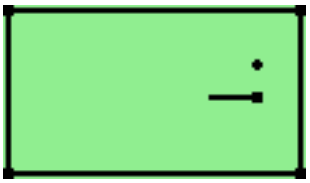

Figure 11.15: Snake 2 – The Snake Strikes Back

Another version of the Snake game. Move the snake around, and eat the apples that pop up on the screen. Each time an apple is eaten, the snake gets longer. The game ends when the snake hits a wall, or runs into itself.

Key	Action
	In menu
Up / Down	Set game speed
Right / Left	Select starting maze
F3	Select game type (A or B)
Play	Start the game
	In game
Up / Down / Left / Right	Steer the snake
Play	Pause and resume the game
Off	Quit

In game A, the maze stays the same, in game B after an increasing number of apples eaten the maze is replaced by a new one.

11.1.19 Sokoban

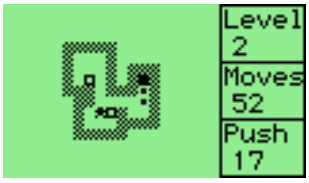

Figure 11.16: Sokoban

The object of the game is to push boxes into their correct position in a crowded warehouse with a minimal number of pushes and moves. The boxes can only be pushed, never pulled, and only one can be pushed at a time.

Sokoban may be used as a viewer for viewing saved solutions and playing external level sets with the `.sok` extension. Level sets should be in the standard Sokoban text format or RLE (Run Length Encoded). For more information about the level format, see http://sokobano.de/wiki/index.php?title=Level_format

Key	Action
	In game
Up, **Down**, **Left**, **Right**	Move the "sokoban" up, down, left, or right
Off	Menu
F1	Back to previous level
F2	Restart level
F3	Go to next level
On	Undo last movement
Play	Redo previously undone move
	Solution playback
Play	Pause/resume
Up/**Down**	Increase/decrease playback speed
Left/**Right**	Go backward/forward (while paused)
Off	Quit

Some places where can you can find level sets:

- http://www.sourcecode.se/sokoban/levels.php
- http://sokobano.de/en/levels.php

Note that some level sets may contain levels that are too large for this version of Sokoban and are unplayable as a result.

11.1.20 Solitaire

Figure 11.17: Klondike solitaire

This is the classic Klondike solitaire game for Rockbox. This is probably the best-known solitaire in the world. Many people do not even realize that other games exist. Though the name may not be familiar, the game itself certainly is. This is due in no small part to Microsoft's inclusion of the the game in every version of Windows. Though popular, the odds of winning are rather low, perhaps one in thirty hands.

For the full set of rules to the game, and other interesting information visit http://www.solitairecentral.com/rules/klondike.html

Key	Action
Up / Down / Left / Right	Move Cursor around.
On	Select cards, move cards, reveal hidden cards...
F1	If a card was selected – unselect it, else Draw 3 new cards from the remains stack
Play	Put the card from the top of the remains stack on top of the cursor
F2	Put the card under the cursor on one of the 4 final colour stacks.
F3	Put the card on top of the remains stack on one of the final colour stacks.
Off	Show menu

11.1.21 Spacerocks

Figure 11.18: Spacerocks

Spacerocks is a clone of the old arcade game Asteroids. The goal of the game is to blow up the asteroids and avoid being hit by them. Once in a while, a UFO will appear – shoot this for extra points.

Key	Action
Play	Shoot
Up	Thrust
Left/ Right	Turn left/right
Down	Teleport
On	Pause game
Off	Quit

11.1.22 Star

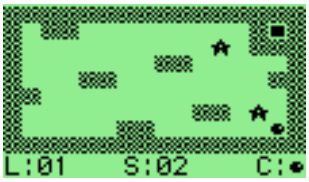

Figure 11.19: Star game

This is a puzzle game. It is actually a rewrite of Star, a game written by CDK designed for the hp48 calculator.

Rules: Take all of the “o”s to go to the next level. You can switch control between the filled circle, which can take “o”s, and the filled square, which is used as a mobile wall to allow your filled circle to get to places on the screen it could not otherwise reach. The block cannot take “o”s.

Key	Action
Left	Move Left
Right	Move Right
Up	Move Up
Down	Move Down
On	Switch between circle and square
F1	Previous level
F2	Reset level
F3	Next level
Off	Exit the game

11.1.23 Sudoku

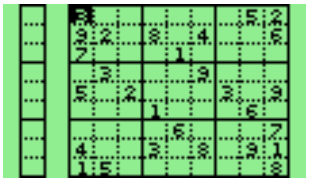

Figure 11.20: Sudoku

Sudoku in Rockbox can act as both a plugin and a viewer. When starting Sudoku from the Browse Plugins menu, a random game will be generated automatically, and an estimate of its difficulty (very easy, easy, medium, hard or fiendish) will be displayed on the screen. New games can be generated from the Generate menu option. When "playing" an existing Sudoku game file from Rockbox' file browser the plugin is invoked as viewer. The selected Sudoku will get loaded and you can start solving it. The sudoku games need to be stored as text files with the extension `.ss` as single file per game.

You can create and save your own grids under the New menu option. Enter the menu (as described in the key table below) when you have finished and enter the full path to save to including the `.ss` extension (e.g. `/sudoku/new.ss`).

The scratchpad

When you play Sudoku on paper most people like to mark numbers in cells that are possible candidates for the cells. This can be done with the scratchpad, shown as separate column. Change the number under the cursor to the number you want to put on the scratchpad and press the scratchpad button, the number will then be added. If the number was already on the scratchpad it will get removed again. The column is stored seperatly for every cell on the board. The stored values can be displayed inline as small dots by enabling the Show Markings settings.

Note: The scratchpad is *not* saved when saving the game.

Key	Action
Up / **Down** / **Left** / **Right**	Move the cursor
Play	Change number under the cursor
Long **Play**	Constantly changing the number under the cursor
F1	Open Menu
F2	Add/Remove number to scratchpad
Off	Quit

Some places where can you can find `.ss` files:

- Simple Sudoku (Advanced Puzzle Packs 1 and 2 located near the bottom of that page): http://www.angusj.com/sudoku/
- Kjell's Sudoku generator/solver: http://kjell.haxx.se/sudoku/

11.1.24 Wormlet

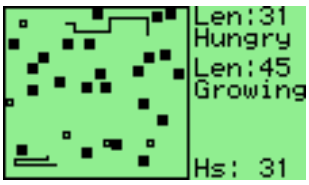

Figure 11.21: Wormlet game

Wormlet is a multi-user multi-worm game on a multi-threaded multi-functional Rockbox console. You navigate a hungry little worm. Help your worm to find food and to avoid poisoned argh-tiles. The goal is to turn your tiny worm into a big worm for as long as possible.

For 2-player games a remote control is not necessary but recommended. If you try to hold the player in the four hands of two players you'll find out why. Games with three players are only possible using a remote control.

Menu controls:

Key	Action
Left / Right	Controls number of worms in the game
Up / Down	Selects number of players
F1	Selects game mode.

Game controls:

Players	Modes	Player 1	Player 2	Player 3
0	Out of control	With no player taking part in the game all worms are out of control and steered by artificial stupidity.		
1	2 key control	on player **Left**: turn left **Right**: turn right	-	-
	4 key control	on player **Left**: turn left **Up**: turn up **Right**: turn right **Down**: turn down	-	-
2	Remote control	on player **Left**: turn left **Right**: turn right	on remote control VOL DOWN: turn left VOL UP: turn right	-
	No remote control	on player **Left**: turn left **Right**: turn right	on player **F2**: turn left **F3**: turn right	-
3	Remote control	on player **Left**: turn left **Right**: turn right	on remote control VOL DOWN: turn left VOL UP: turn right	on player **F2**: turn left **F3**: turn right

The game

Use the control keys of your worm to navigate around obstacles and find food. Worms do not stop moving except when dead. Dead worms are no fun. Be careful as your worm will try to eat anything that you steer it across. It won't distinguish whether it is edible or not.

Food. The small square hollow pieces are food. Move the worm over a food tile to eat it. After eating the worm grows. Each time a piece of food has been eaten a new piece of food will pop up somewhere. Unfortunately for each new piece of food that appears two new "argh" pieces will appear, too.

Argh. An "argh" is a black square poisoned piece - slightly bigger than food - that makes a worm say "Argh!" when run into. A worm that eats an "argh" is dead. Thus eating an "argh" must be avoided under any circumstances. "Arghs" have the annoying tendency to accumulate.

Worms. Thou shall not eat worms. Neither other worms nor thyself. Eating worms is blasphemous cannibalism, not healthy and causes instant death. And it doesn't help anyway: the other worm isn't hurt by the bite. It will go on creeping happily and eat all the food you left on the table.

Walls. Don't crash into the walls. Walls are not edible. Crashing a worm against a wall causes it a headache it doesn't survive.

Game over. The game is over when all worms are dead. The longest worm wins the game.

Pause the game. Press **Play** to pause the game. Press **Play** again to resume the game.

Stop the game. There are two ways to stop a running game.

- If you want to quit Wormlet entirely simply hit **Off** . The game will stop immediately and you will return to the game menu.
- If you want to stop the game and still see the screen hit **On** . This freezes the game. If you hit **On** button again a new game starts with the same configuration. To return to the games menu you can hit **Off** . A stopped game can not be resumed.

The scoreboard

On the right side of the game field is the score board. For each worm it displays its status and its length. The top most entry displays the state of worm 1, the second worm 2 and the third worm 3. When a worm dies its entry on the score board turns black.

Len: Here the current length of the worm is displayed. When a worm is eating food it grows by one pixel for each step it moves.

Hungry: That's the normal state of a worm. Worms are always hungry and want to eat. It is good to have a hungry worm since it means that your worm is alive. But it is better to get your worm growing.

Growing: When a worm has eaten a piece of food it starts growing. For each step it moves over food it can grow by one pixel. One piece of food lasts for 7 steps. After your worm has moved 7 steps the food is used up. If another piece of food is eaten while growing it will increase the size of the worm for another 7 steps.

Crashed: This indicates that a worm has crashed against a wall.

Argh: If the score board entry displays "Argh!" it means the worm is dead because it tried to eat an "argh". Until we can make the worm say "Argh!" it is your job to say "Argh!" aloud.

Wormed: The worm tried to eat another worm or even itself. That's why it is dead now. Making traps for other players with a worm is a good way to get them out of the game.

Hints

- Initially you will be busy with controlling your worm. Try to avoid other worms and crawl far away from them. Wait until they curl up themselves and collect the food afterwards. Don't worry if the other worms grow longer than yours - you can catch up after they've died.
- When you are more experienced watch the tactics of other worms. Those worms controlled by artificial stupidity head straight for the nearest piece of food. Let the other worm have its next piece of food and head for the food it would probably want next. Try to put yourself between the opponent and that food. From now on you can 'control' the other worm by blocking it. You could trap it by making a 1 pixel wide U-turn. You also could move from food to food and make sure you keep between your opponent and the food. So you can always reach it before your opponent.
- While playing the game the player can still play music. For single player game use any music you like. For berserk games with 2 players use hard rock and for 3 player games use heavy metal or X-Phobie (http://www.x-phobie.de/). Play fair and don't kick your opponent in the toe or poke him in the eye. That would be bad manners.

11.1.25 Xobox

Figure 11.22: Xobox

Xobox is a simple clone of the well known arcade game Qix. The aim of the game is to section off parts of the arena with your trail in order to remove that section from the game. Be careful not to get in the way of enemy balls because, if they hit you or your trail, you lose a life. To finish a level you have to section off more than 75%.

Key	Action
Up, **Down**, **Left**, **Right**	Move around the arena
Play	Pause
Off	Open menu

11.2 Demos

11.2.1 Bounce

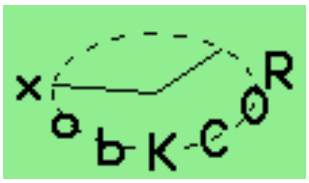

Figure 11.23: Bounce

This demo is of the word "Rockbox" bouncing across the screen. There is also an analogue clock in the background. In Scroll mode the bouncing text is replaced by a different one scrolling from right to left.

Key	Action
Up / Down	Moves to next/previous option
Left / Right	Increases/decreases option value
On	Toggles Scroll mode
Off	Exits bounce demo

Available options are:

Xdist/Ydist. The distance to X axis and Y axis respectively

Xadd/Yadd. How fast the code moves on the sine curve on each axis

Xsane/Ysane. Changes the appearance of the bouncing.

11.2.2 Credits

The credits plugin scrolls the entire list of the names of all the Rockbox contributors after displaying the Rockbox logo and version. This plugin is called when selecting Version from the System section of the Rockbox main menu. Exit at any time by pressing **Left** or **Off**.

11.2.3 Cube

Figure 11.24: Cube

This is a rotating cube screen saver in 3D.

Key	Action
On	Display at maximum frame rate
Play	Pause
F3	Cycle draw mode
Right / Left	Select axis to adjust
Up / Down	Change speed/angle (speed can not be changed while paused)
Off	Quit

11.2.4 Demystify

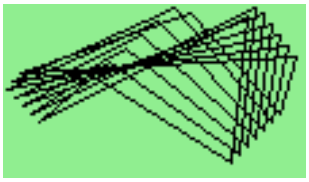

Figure 11.25: Demystify

Demystify is a screen saver like demo.

Key	Action
Up / **Down**	Increase / decrease speed
Right / **Left**	Add / remove polygon
Off	Quit

11.2.5 Fire

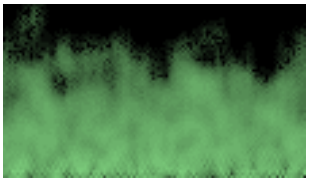

Figure 11.26: Fire

Fire is a demo displaying a fire effect.

Key	Action
Up / **Down**	Increase / decrease number of flames
On	Toggle flame type
Play	Toggle moving flames
Off	Quit

11.2.6 Logo

Demo showing the Rockbox logo bouncing around the screen.

Key	Action
Right / Left	Increase / decrease speed on the x-axis
Up / Down	Increase / decrease speed on the y-axis
Off	Quit

11.2.7 Mandelbrot

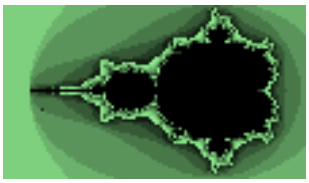

Figure 11.27: Mandelbrot

This demonstration draws fractal images from the Mandelbrot set using the greyscale engine.

Key	Action
Direction keys	Move about the image
Play	Zoom in
On	Zoom out
F1	Decrease iteration depth (less detail)
F2	Increase iteration depth (more detail)
F3	Reset and return to the default image
Off	Quit

11.2.8 Mosaique

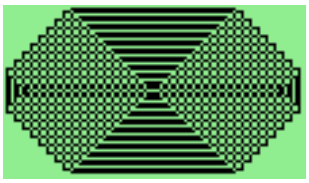

Figure 11.28: Mosaique

This simple graphics demo draws a mosaic picture on the screen of the player. Press **Off** to quit.

11.2.9 Oscilloscope

Figure 11.29: Oscilloscope

This demo shows the shape of the sound samples that make up the music being played.

Keys

Key	Action
F1	Toggle filled / curve / plot
F2	Toggle whether to scroll or not
F3	Toggle drawing orientation
Play	Pause the demo
Up / Down	Increase / decrease volume
Right / Left	Increase / decrease speed
Off	Exit demo

11.2.10 Plasma

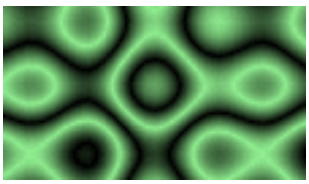

Figure 11.30: Plasma

Plasma is a demo displaying a 80's style retro plasma effect.

Key	Action
Up / Down	Adjust frequency
Off	Quit

11.2.11 Snow

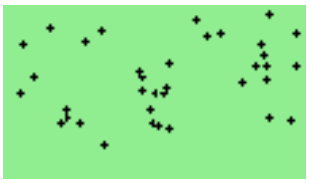

Figure 11.31: Have you ever seen snow falling?

This demo replicates snow falling on your screen. If you love winter, you will love this demo. Or maybe not. Press **Off** to quit.

11.2.12 Starfield

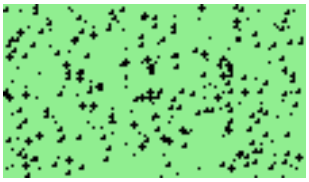

Figure 11.32: Starfield

Starfield simulation (like the classic screensaver).

Key	Action
Right / Left	Increase / decrease number of stars
Up / Down	Increase / decrease speed
Off	Quit

11.2.13 VU meter

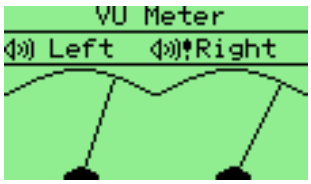

Figure 11.33: VU-Meter

This is a VU meter, which displays the volume of the left and right audio channels. There are 3 types of meter selectable. The analogue meter is a classic needle style. The digital meter is modelled after LED volume displays, and the mini-meter option allows for the display of small meters in addition to the main display (as above). From the settings menu the decay time for the meter (its memory), the meter type and the meter scale can be changed.

Key	Action
Off	Save settings and quit
On	Help
F1	Settings
Up	Raise Volume
Down	Lower Volume

11.3 Viewers

Viewers are plugins which are associated with specific file extensions. They cannot be run directly but are started by "playing" the associated file. Viewers are stored in the **/.rockbox/rocks/viewers/** directory.

11.3.1 Shortcuts

The Shortcuts Plugin allows you to jump to places within the file browser without having to navigate there manually. The plugin works with `.link` files. A `.link` file is just a text file with every line containing the name of the file or the directory you want to quickly jump to. All names should be full absolute names, i.e. they should start with a `/`. Directory names should also end with a `/`.

How to create `.link` files

You can use your favourite text editor to create a `.link` file on the PC an then copy the file to the player. Or you can use the context menu on either a file or a directory in

the file browser tree, and use the "Add to shortcuts" menu option. This will append a line with the full name of the file or the directory to the `shortcuts.link` file in the root directory of the player. (The file will be created if it does not exist yet.) You can later rename the automatically created `shortcuts.link` file or move it to another directory if you wish. Subsequent calls of the context menu will create it again.

How to use `.link` files, i.e. jump to desired places

To use a `.link` file just "play" it from the file browser. This will show you a list with the entries in the file. Selecting one of them will then exit the plugin and leave you within the directory selected, or with the file selected in the file browser. You can then play the file or do with it whatever you want. The file will not be "played" automatically.

If the `.link` file contains only one entry no list will be shown, you will directly jump to that location. The file `shortcuts.link` in the root directory is an exception. After "playing" it, the list will be shown even if the file contains just one entry.

If the list you are seeing is from `shortcuts.link` in the root directory, you can delete the selected entry by pressing **F1**. Deleting entries from other `.link` files is not possible.

Advanced Usage

Placing the line "#Display last path segments=n" (where n is a number) in the beginning of a `.link` file will leave just the last n segments of the entries when they are shown. For example, if n is chosen to be 1, then the entry `/MyMusic/collection/song.mp3` will be shown as `song.mp3`. This allows you to hide common path prefixes.

You can also provide a custom display name for each entry individually. To do so, append a tabulator character after the entry's path followed by your custom name. That name will then be used for showing the entry. For example:

Example

```
/MyMusic/collection/song.mp3<TAB>My favourite song!
```

11.3.2 Chip-8 Emulator

Chip8 is a kind of assembly language for a long-gone architecture. This plugin runs games written using the chip8 instructions. To start a game open a `.ch8` file in the File Browser

There are lots of tiny Chip8 games (usually only about 256 bytes to a couple of KB) which were made popular by the HP48 calculator's emulator for them. The original Chip8 had 64x32 pixel graphics, and the new superchip emulator supports 128x64 graphics.

The only problem is that they are based on a 4x4 keyboard, but since most games do not use all of the buttons, this can easily be worked around.

To do this, one may put a `.c8k` file with the same name as the original program which contains new key mappings (for `BLINKY.ch8`, one writes a `BLINKY.c8k` file). That `.c8k` file contains 16 characters describing the mapping from the Chip8 keyboard to

the default key mapping (that way, several Chip8 keys can be pressed using only one Rockbox key). For example, a file containing the single line:

CODE
```
0122458469ABCDEF
```

would correspond to the following non-default mappings:
3 → 2, 6 → 8, 7 →4, 8 → 6.
The default keymappings are:

Chip8	Off	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Key	**Off**		**F1**	**Up**	**F3 Left**	**Play**	**Right**	**F2**	**Down**	**On**							

Some places where can you can find `.ch8` files:

- The PluginChip8 page on www.rockbox.org has several attached: ☞PluginChip8
- Check out the HP48 chip games section: http://www.hpcalc.org/hp48/games/chip/
- PC emulator by the guy who wrote the HP48 emulator: http://www.pdc.kth.se/~lfo/chip8/CHIP8.htm
- Links to other chip8 emulators: http://www.zophar.net/chip8.html

11.3.3 JPEG viewer

Open a JPEG file in the FILE BROWSER to view it using Rockbox's greyscale library.
Note: This plugin will cause playback to stop.

Key	Action
Up / **Down** / **Left** / **Right**	Move around in zoomed in image
Play	Zoom in
On	Zoom out
F3	Next jpeg in directory
F2	Previous jpeg in directory
Off	Show menu

The menu has the following entries.

Quit. Quits the viewer and returns to the FILE BROWSER.

Toggle Slideshow Mode. Enables or disables the slideshow mode.

Change Slideshow Timeout. You can set the timeout for the slideshow between 1 second and 20 seconds.

Return. Returns you to the image

Note: Progressive scan and other unusual JPEG files are not supported, and will result in various "unsupported xx" messages. Processing could also fail if the image is too big to decode which will be explained by a respective message.

11.3.4 Movie Player

Play movies on your player! In order to do this, movies must be in AVI format, and then converted to `.RVF`, Rockbox's own video format. For more details on how to use this plugin, please see ☞VideoTutorial.

11.3.5 Rockbox_flash

For "playing" `.UCL` files on a flashed player. Reprograms the flash memory of the player unit (see section 12.5 (page 120) for details).

11.3.6 Rockboy

Figure 11.34: Rockboy

Rockboy is a Nintendo Game Boy and Game Boy Color emulator for Rockbox based on the gnuboy emulator. To start a game open a ROM file saved as `.gb` or `.gbc` in the file browser.

Default keys

Key	Action
Up / Down / Left / Right	Direction keys
F1	A button
F2	B button
F3	Start
Play	Select
On	Cycle display scaling modes
Off	Open Rockboy menu

Rockboy menu

Load Game... Loads a previously saved game.

Save Game... Saves your current state.

Options... Max Frameskip. Change frameskip setting to improve speed.
Sound. Toggle sound on or off.
Stats. Toggle showing fps and current frameskip.
Set Keys (BUGGY) Select this option to set a new keymapping.

Quit RockBoy. Quits the Rockboy plugin.

11.3.7 Search

This plugin can be used on playlists. It searches through the playlist that it opened on looking for any occurrences of the string entered by the user. The results of this search are saved to a new playlist, **search_results.m3u**, within the same directory as the original playlist.

11.3.8 Sort

This plugin takes a file and sorts it in ascending alphabetical order. Case is ignored. This is useful for ordering playlists generated by the Create Playlist menu option (see section 5.9 (page 40)).

11.3.9 Text Viewer

This is a Viewer for text files with word wrap. Just open a .txt file to display it. The text viewer features controls to handle various styles of text formatting, has top-of-file and bottom-of-file buttons. You can view files without a `.txt` extension by using *Open with* from the *Context Menu* (see section 4.1.2 (page 21)).

Key	Action
Up	Scroll-up
Down	Scroll-down
Left	Top of file (Narrow mode) / One screen left (Wide mode)
Right	Bottom of file (Narrow mode) / One screen right (Wide mode)
On+Up	One line up
On+Down	One line down
On+Left	One column left
On+Right	One column right
Play	Toggle autoscroll
F1	Enter menu
Off	Exit text viewer

The Viewer's Menu

Quit Exits the plugin.

Viewer Options Encoding sets the codepage in the text viewer. Available settings: UTF-8 (Unicode), BIG5 (Traditional Chinese), KSX-1001 (Korean), GB-2312 (Simple Chinese), SJIS (Japanese), CP1250 (Central European), ISO-8859-2 (Latin Extended), ISO-8859-9 (Turkish), ISO-8859-6 (Arabic), ISO-8859-11 (Thai), CP1251 (Cyrillic), ISO-8859-8 (Hebrew), ISO-8859-7 (Greek), ISO-8859-1 (Latin 1). This setting only applies to the plugin and is independent from the Default Codepage setting (see section **??** (page **??**)).

Word Wrap toggles between Wrap and Chop.

Off (Chop Words) breaks lines at white space or hyphen.

On breaks lines at the maximum column limit.

Line Mode cycles through Normal, Join and Expand and Reflow Lines.

Reflow Lines justifies the text fully.

Expand adds a blank line. Useful for making the paragraphs clearer in some book style text files.

Join joins lines. Useful for adopting the orphans that occur with e-mail style (i.e. pre-wrapped) text files.

Normal breaks lines at newline characters.

Wide View toggles between Narrow and Wide.

Yes sets maximum column to 114. Useful for navigating large files. (Currently, Wide and Join cannot be selected together.)

No (Narrow) sets maximum column to the screen width.

Show Scrollbar toggles scrollbar for the current View mode. If the file fits on one screen, there is no scrollbar and toggling this setting has no effect.

On has a scrollbar by default, until toggled.
Off has no scrollbar by default, until toggled.

Overlap Pages toggles between Normal and Overlap.
Yes tells page-down/page-up to retain one line from previous screen.
No sets page-down/page-up to one full screen.

Scroll Mode controls the function of the "Scroll-up" and "Scroll-down" buttons.
Scroll by Line
Scroll by Page

Auto-scroll Speed controls the speed of auto-scrolling in number of lines per scroll step, available options are 1 to 10 lines. As an example, a setting of 4 will scroll up the text four lines per second.

Show Playback Menu controls the playback of the currently loaded playlist and change the volume of your playerwithout leaving the plugin.

Return to the text view.

Note: The text viewer automatically saves its settings and also stores the current position in the viewed text files (up to the last 46 files).

Compatibility

- Currently messages are in English
- Does not currently support right-to-left languages.

11.3.10 VBRfix

This function scans a VBR (Variable Bitrate) MP3 file and updates/creates the Xing VBR header. The Xing header contains information about the VBR stream used to calculate average bit rate, time information and to more accurately fwd/rew in the stream. This function is especially useful when the playback of a file skips, fwd/rew does not work correctly or the time display is incorrect.
Note: VBRfix can only run when music is turned off (since it uses the same memory as the player) and can take a while to complete if run on big files.

11.3.11 Wavplay

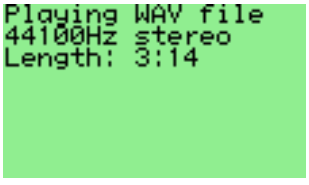

Figure 11.35: Wavplay

This plugin is for demo purposes only. It is planned to have Wavplay as part of the normal playback engine later.

At the moment it is only possible to start playing one `.wav`-file at a time. Therefore playlists are impossible. As every other viewer plugin, Wavplay is associated with the specific files. Playing a `.wav`-file starts the plugin automatically and the Wavplay screen appears. This screen gives information about samplerate and length of the playing file.
Note: Seeking within the `.wav`-file or changing the volume once the plugin is running is not possible. Wavplay uses the sound settings that were used before (except for pitch).

The only action that can be performed is to stop by pressing **Off**, and Wavplay will be exited and you are returned to the filebrowser. If the end of the file has been reached, you will also be returned to the filebrowser.

11.3.12 ZXBox

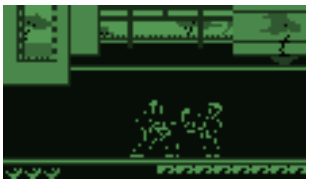

Figure 11.36: ZXBox

ZXBox is a port of the "Spectemu" ZX Spectrum 48k emulator for Rockbox (☞project's homepage). To start a game open a tape file or snapshot saved as `.tap`, `.tzx`, `.z80` or `.sna` in the file browser.

Note: As ZXBox is a 48k emulator only loading of 48k z80 snapshots is possible.

Default keys

The emulator is set up for 5 different buttons: Up, Down, Left, Right and Jump/Fire. Each one of these can be mapped to one key of the Spectrum Keyboard or they can be used like a "Kempston" joystick. Per default the buttons, including an additional but fixed menu button, are assigned as follows:

Key	Action
Up/Down/ Left/Right	Directional movement
Play	Jump/Fire
F1	Open ZXBox menu

ZXBox menu

Vkeyboard. This is a virtual keyboard representing the Spectrum keyboard. Controls are the same as in standard Rockbox, but you just press one key instead of entering a phrase.

Play/Pause Tape. Toggles playing of the tape (if it is loaded).

Save Quick Snapshot. Saves snapshot into `/.rockbox/zxboxq.z80`.

Load Quick Snapshot. Loads snapshot from `/.rockbox/zxboxq.z80`.

Save Snapshot. Saves a snapshot of the current state. You would enter the full path and desired name - for example `/games/zx/snapshots/chuckie.sna`. The snapshot format will be chosen after the extension you specified, per default `.z80` will be taken in case you leave it open.

Toggle Fast Mode. Toggles fastest possible emulation speed (no sound, maximum frameskip etc.). This is Useful when loading tapes with some specific loaders.

Options. Map Keys To Kempston. Controls whether the player's buttons should simulate a "Kempston" joystick or some assigned keys of the Spectrum keyboard.

Display Speed. Toggle displaying the emulation speed (in percent).

Invert Colors. Inverts the Spectum colour palette, sometimes helps visibility.

Frameskip Sets the number of frames to skip before displaying one. With zero frameskip ZXBox tries to display 50 frames per second.

Sound. Turns sound on or off.

Volume. Controls volume of sound output.

Predefined Keymap Select one of the predefined keymaps. For example 2w90z means: map ZXBox's **Up** to 2, **Down** to w, **Left** to 9, **Right** to 0 and **Jump/Fire** to z. This example keymap is used in the "Chuckie Egg" game.

Custom Keymap This menu allows you to map one of the Spectrum keys accessible through the plugin's virtual keyboard to each one of the buttons.

Quit. Quits the emulator..

Hacking graphics

Due to ZXBox's simple (but fast) scaling to the screen by dropping lines and columns some games can become unplayable. It is possible to hack graphics to make them better visible with the help of an utility such as the "Spectrum Graphics Editor". Useful tools can be found at the "World of Spectrum" site (http://www.worldofspectrum.org/utilities.html).

11.4 Applications

11.4.1 Alpine CD changer emulator

This plugin emulates an Alpine CD changer. It allows to plug the Archos to a compatible head unit and control the playback from there, too. Currently implemented is track change, shuffle, seek, but no disk change. The plugin is a TSR, meaning it silently operates in the background once started. It will keep doing so until a new plugin is started. Alpine also did M-Bus as OEM for other brands (Honda, Acura, Volvo, BMW, etc.) Nowadays Alpine uses a different protocol, called Ai-Net, not supported by this plugin. (As well as all other protocols, please do not ask for such!)

The cable

Hookup to Archos works by connecting the headphone output including the remote pin (you need a 4-ring 3.5 mm plug for that) to the changer jack of the radio. M-Bus radios have a DIN-style circular jack with 8 pins (7 in a $\sim$ 270 degree circle, one in the center). A standard 5-pin DIN plug is OK for this, since we do not use the other (power) pins.

As OEM, they shuffled the pins around a bit, better check first if it is not genuine Alpine. The bus pin is pulled high to 12 volts with a $\sim$ 2kOhm resistor, pulses driven low. Because it is open collector, this is not harmful to the Archos.
ASCII art of the 4-pin headphone plug:

```
/ \
\_/ left    -> Alpine pin 5
|_| right   -> Alpine pin 4
|_| remote  -> Alpine pin 1
|_| ground  -> Alpine pin 2 + 3
```

The remote pin can be programmed bidirectional, that is the reason this works. Very luckily the M-Bus uses a single wire communication and the two radios I tried are happy with the 3.3 Volt level the Arcos can deliver. So the connection is a simple cable! For all protocols requiring more lines, an external controller would be necessary.
Note: Archos FMs do not have the remote pin internally connected, but one unit that was opened was internally prepared for it, a matter of closing a bridge.

11.4.2 Battery Benchmark

The Battery Benchmark Plugin enables you to test your battery's performance, while making normal use of your player. Once loaded it will run in the background (TSR plugin), reading various info about your battery while you use it. Once you finish your session you can find the benchmark output data in a file on your player `/battery_bench.txt`. Please submit your results to the Rockbox wiki. ☞BatteryRuntime

How it works

After you load the plug-in the operation of your player continues as normal. You can do whatever you could do before loading the plugin except loading another plugin. If you happen to load a plugin while benchmarking, a splash screen will inform you about the termination of the benchmark. While you operate it will log various battery related information every time the disk is activated by external causes, (buffer refill, open directory, USB mode) or an hour passes without updating the log file.
The plugin will continue to log info until:

- Another plugin is loaded.
- The player is shut down.
- The battery is empty.

Between disk activity (or an hour), it will log info in memory (every measurement is captured when the voltage changes). If there are too many measurements older entries will be deleted and the log file will inform the user about the interval where entries were lost. Benchmarks can be resumed if you accidentally load a plugin, or turn off your player, as long as the log file `/battery_bench.txt` is not deleted.

Information explained

On the top of the file you will see various info on how to use the plugin.

Time This column reports the total time of operation of the player. It is not the time that you started the plug-in. If you have your player on for 5 minutes and then start the plugin, it will start measuring from 5 minutes.

Seconds As time, it shows time passed in seconds. Nothing special, it is there because it is free and maybe someone might want to make graphs with seconds.

Level The percent level of the battery estimated by Rockbox. This is an estimation and not an accurate result. Using the real percentage (current battery voltage / top battery voltage) * 100) we can calculate the difference between the estimation. Goal of this column is to make the estimation algorithm of Rockbox more accurate.

Time Left It shows the estimated (by Rockbox) remaining time until shutdown. Again, as with Level(above), this column can be used to see differences between real time left and estimated time left. This could help make time left more accurate.

Voltage The battery voltage, the moment the measurement was captured. Measurements are captured when this number changes while benchmarking. This column can be used to give quite interesting graphs in a spreadsheet program. (Excel, Calc, e.t.c)

M/DA (Measurements per Disk Activity) The number of measurements stored temporarily in memory, before written on the log file. This can give you an idea of how many voltage changes there are between disk activity (or one hour).

C Stands for Charger. An "A" in that column shows if there was the power adapter attached to the unit, at the time of the measurement.

S The "S" column shows the state of the device (Charging, or not). The "C" indicated that the unit was charging when the measurement was captured.

U USB powered. Only for targets that support this. A "U" will indicate if the unit was using the USB port for powering.

Making graphs

While you can tell how long your battery lasted, with a single look at the last line of the battery log (`/battery_bench.txt`), the most useful purpose of Battery Benchmark is to make graphs using a spreadsheet program like Excel or Calc. The battery log (`/battery_bench.txt`) is in CSV format (comma separated) so you can quite easily import it to a spreadsheet program.

11.4.3 Calculator

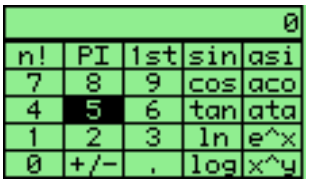

Figure 11.37: Calculator

This is a simple scientific calculator for use on the player. It works like a standard calculator. Pressing the "1st" and "2nd" buttons will toggle between other available math functions.

Key	Action
Left / Right / Up / Down	Move around the keypad
Play	Select a button
F1	Delete last entered digit or clear after calculation
F2	Cycle through the 4 basic operators
F3	Calculate
Off	Quit

11.4.4 Calendar

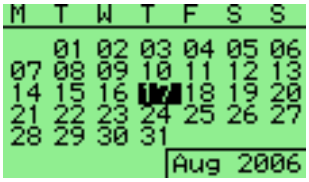

Figure 11.38: Calendar

This is a small and simple calendar application with memo saving function. Dots indicate dates with memos. The available memo types are: one off, yearly, monthly, and weekly memos.

Key	Action
Left / Right / Up / Down	Move the selector
Play	Show memos for the selected day
On + Up / Down	Previous / Next month
Off	Quit

11.4.5 Chess Clock

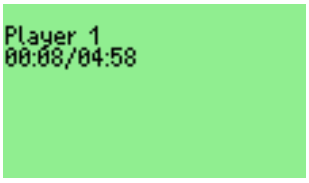

Figure 11.39: Chess Clock

The chess clock plugin is designed to simulate a chess clock, but it can be used in any kind of game with up to ten players.

Setup

Key	Action
Up / Down	Increase / decrease displayed Value
Play	Move to next screen
Off	Move to previous screen

- First enter the number of players (1–10)
- Then set the total game time in mm:ss
- Then the maximum round time is entered. For example, this could be used to play Scrabble for a maximum of 15 minutes each, with each round taking no longer than one minute.
- Done. Player 1 starts in paused mode.

While playing

The number of the current player is displayed on the top line. The time below is the time remaining for that round (and possibly also the total time left if different).

Keys are as follows:

Key	Action
Off	Exit plugin
Left	Restart round for the current player
Play	Pause the time (press again to continue)
Up	Switch to next player
Down	Switch to previous player
F1	Open menu (**Play** to select.)

From the menu it is possible to delete a player, modify the round time for the current player or set the total time for the game. When the round time is up for a player the message "ROUND UP!" is shown (press NEXT to continue). When the total time is up for a player the message "TIME UP!"is shown. The player will then be removed from the timer.

11.4.6 Clock

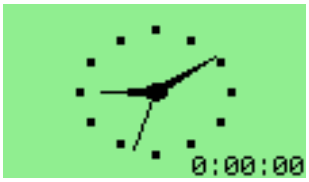

Figure 11.40: Clock

This is a fully featured analogue and digital clock plugin.

Key configuration

Key	Action
Left / Right	Cycle through modes
Up / Down	Cycle through skins
F1	Main Menu
Play	Start / Stop Counter
Long	Reset Counter
Off	Save Settings (if enabled) and Exit

Clock Menu

View Clock Exits the menu and returns to the current clock mode display.

Mode Selector Opens a menu from which you can select a clock mode to view.

Counter Settings Opens a menu from which you can adjust settings pertaining to the counter.

Mode Settings Opens a menu from which you can adjust settings pertaining to the current clock mode (analog, digital, binary).

General Settings Reset Settings Reset all settings to their default values.

Save Settings Save all settings to disk.

Show Counter Toggle Counter display.

Save Choose whether to disable automatic saving, saving to disk on exit, or saving to disk every settings change.

Backlight Choose whether to disable the backlight, use the user's timeout setting, or keep the backlight on.

Idle Poweroff Toggle Idle Poweroff.

Note: This setting is not saved to disk.

Help Opens a brief help screen with key mappings and functionality.

Credits Displays a credits roll.

Analog mode

Small, round, analog clock is displayed in the middle of the LCD. Time readout, if enabled, is displayed at the upper left. If Time readout is in 12-hour ("12h") mode, AM or PM will be displayed at the upper right. The Date readout, if enabled, is displayed at the lower left. The Counter, if enabled, is displayed at the lower right. The second hand, if enabled, is displayed along with the hour and minute hands. Digit display, if enabled, places "12", "3", "6", and "9" around the face of the clock in their respective positions.

Digital mode

An imitation of an LCD, this mode shows a Clock comprised of digital "segments". The Date readout, if enabled, is displayed at the bottom, center. The Second readout, if in "Text" mode, is displayed at the top, center; if in "Bar" mode, is displayed as a progress bar at the top of the LCD; if in "Invert" mode, will invert the LCD left-to-right as the seconds pass (a fully-inverted LCD means the entire minute has passed). The Counter, if displayed, is shown at the upper left. The Blinking Colon, if enabled, blinks the colon once every second. 12-hour mode, if enabled, will display the time in a 12-hour format.

LCD mode

Based on the Digital Mode, the LCD mode is another imitation of an LCD. The settings available in this mode are exactly the same as Digital Mode, but they are independent

of Digital Mode. For example, you can have the Date Readout enabled in Digital Mode and disabled in LCD Mode.

Fullscreen

A Fullscreen clock is displayed. Show Border, if enabled, will draw a small box at every hour position (1 through 12). Invert Seconds, if enabled, will invert the LCD as the seconds pass. Second Hand, if enabled, will draw a second hand among the hour and minute hands.

Binary mode

This mode shows a Binary clock. The hour is displayed on the top line, the minute is displayed on the middle line, and the seconds are on the last line. Circle mode, if enabled, draws empty and full circles, instead of zeros and ones. For help on reading binary, please visit: http://en.wikipedia.org/wiki/Binary_numeral_system

Plain mode

This mode shows a "plain" clock in large text that takes up nearly the whole LCD.

11.4.7 Disk Tidy

Disk Tidy deletes junk files left behind by Windows, Linux or OS X after a USB connection. Select the OS's files you want to delete in the 'Files to Clean' menu and select 'Start Cleaning' to begin to process. The settings are stored in `.rockbox/rocks/apps/disktidy.config`, in a plain text file that is user-modifiable to allow more entries to be added.

Available Options

All selects all Linux, OS X, and Windows files.

None deselects all file options.

Linux selects Linux files. Default files are `.dolphinview`, `.d3lphinview`, and `.Trash-*/`.

Windows selects Windows files. Default files are `Thumbs.db`, `RECYCLE.BIN`, `Desktop.ini`, `/Recycled` and `/System Volume Information`.

Mac selects OS X files. Default files are `._*`, `.DS_Store` and `/.Trashes`.

Other selects additional files added in by the user.

Key	Action
Left or **Off**	Exit / Abort

11.4.8 Firmware_flash

[Warning: Image ignored]
Firmware_flash

Use when flashing Rockbox (see section **??** (page **??**). In the ideal case, you'll need this tool only once. For safety reasons you may wish to delete **firmware_flash.rock** from **/.rockbox/rocks** once flashing is complete.

11.4.9 Keybox

Keybox is an encrypted password storage using the "Tiny Encryption Algorithm" with a key derived using md5.

Using Keybox

To get started, start up the plugin and select Enter Keybox. The first time you enter Keybox you will be prompted for a master password and for confirmation of the master password. The master password is the password that you must use to access your stored passwords.

Once inside, enter the context menu by pressing Long **Play**. From the context menu you can create new entries, delete entries and edit entries. Each entry has a "title", a "user name" and a "password".

Selecting Reset Keybox from the main menu will delete the current list of passwords and a new, empty list will be created the next time you select Enter Keybox after prompting for a new master password. Entries are automatically saved when the plugin is exited.

11.4.10 Lamp

Lamp is a simple plugin to use your player as a lamp (flashlight, torch). You get an empty screen with maximum brightness.

Key	Action
Off	Quit

11.4.11 md5sum

Open a file, a directory or just launch it from the plugin menu to create an md5sum of the file, the directory's contents or the whole filesystem. If the file's extension is `.md5` or `.md5sum`, it will check the md5 sums in the file instead. If the file's extension is .md5list it will compute md5 sums for all the files listed.

11.4.12 Metronome

This plugin can be used as a metronome to keep time during music practice. Adjust the tempo through the interface or by tapping it out on the appropriate button.

Key	Action
Off	Exit plugin
Play	Start / Stop
On	Tap tempo
Left / Right	Adjust tempo
Up / Down	Adjust volume

11.4.13 Random Folder Advance Configuration

This plugin is used to configure the folders which will be considered when the Auto-Change Directory feature is set to Random.

Menu

Generate Folder List Generates a list of all folders found on the player. You can filter the directories which are scanned by creating a file called `/.rockbox/folder_advance_dir.txt`. Only the directories in this file and any contained directories will be scanned. You can have up to 10 directories ignored by the scan by placing a minus sign before them in the list (i.e. `-/CDs` will cause everything in the `/CDs` directory to be ignored.). If you just want `/CDs` to be ignored but want to include the folders within it you need to have both `-/CDs` and `CDs` as entries.

Edit Folder List Enter the folder list editor

Export List To Textfile Exports the list to `/.rockbox/folder_advance_list.txt`

Import List From Textfile Imports the list from `/.rockbox/folder_advance_list.txt`

Quit

Folder List Editor Keys

Key	Action
Right or **On**	Delete selected folder
Long **Play**	Bring up the context menu which allows you to remove the selected folder or it's entire folder tree
Left or **Off**	Exit

11.4.14 Split Editor

When recording an mp3 file, it is common practice to start the recording a little bit early and stop it a little bit late to ensure all the desired sound is recorded. This results in recordings that contain extra snippets of sound in the beginning and the end. Unfortunately these snippets can not be deleted easily because they are stored in the same file as the desired recording. The purpose of the split editor is to split an mp3 file (the input file) at a point in time (split point). Two new files can be generated from the input file. The first file contains the part before the split point and the second file contains the part after the split point. Once this process has been successful the original file can be deleted or kept as a backup. The whole process of splitting an mp3 file consists of three steps:

- Defining the split point
- Generating the result files
- If desired deleting the input file (with the browser, not the split editor)

How To Use The Split Editor

When the device plays the song just hit the **Play** button to pause, when playback has roughly reached the split point. This need not be very precise as the split point can be fine tuned later. A screen similar to the one below will appear.

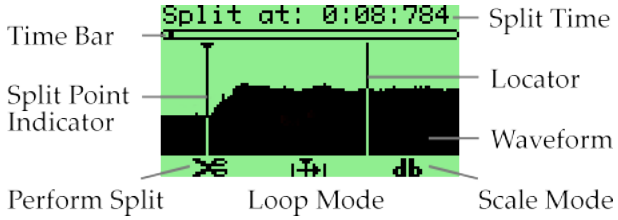

Figure 11.41: The Split Editor's Main Screen

The Split Editor's Main Screen

The waveform displays the volume of the song over time. It will appear as the song plays and help to visually identify the point in time where the split is desired

The split point indicator is a vertical line with a small triangle at the top end. It is the most important control element of the split editor. It can be moved with the **Left** and **Right** buttons. Later, when you have fine tuned the split point, the song will be split at this position.

The split time At the top of the window a time value is displayed. This is the point in time within the song at which the split point indicator is positioned.

The locator Another vertical bar represents the position locator. It moves along as the song plays. In contrast to the split point indicator it has no triangles at the ends.

The time bar displays the current position within the song relative to the whole song. The entire length of the time bar represents the song length. The length of the solid part of the time bar represents the position and length of the displayed part of the song.

The scale mode On the right side of the bottom line the scale mode is displayed. The waveform can be scaled either logarithmically or linearly. In logarithmic scale mode the letters "dB" are displayed, in linear mode "%". Use **F3** to switch between these modes. Linear mode usually gives better optical hints with commercially recorded music. For quiet recordings, especially of human speech, the logarithmic scale often is preferable. More information in the Scale section 11.4.14 (page 112) below.

The loop mode In the middle of the bottom line the loop mode icon is displayed. There are 4 different loop modes. Pressing **F2** changes to the next loop mode.

- Playback loops around the split point indicator. This mode is best used when searching and zooming for the desired point at which to split the recording.
- Playback loops from the split point indicator to the end of the visible area. This mode is best used when fine tuning the split indicator position at the beginning of a recording.
- Playback loops from the beginning of the visible area to the split point. This mode is best used when fine tuning the split indicator position at the end of a recording.
- Playback does not loop, the borders of the visible area as well as the split point indicator are ignored. This mode is best used when playing the song outside of the borders of the displayed region.

Perform the split (8) The icon above the **F1** button indicates its function to execute the split. When split positioning is complete open the save dialogue with **F1** .

Key	Action
Off	Quit plugin
Left / Right	Move the split point indicator
Up / Down	Zoom in / out
Play	Play from the split position
F1	Enter the save dialogue
F2	Toggle loop modes
F3	Toggle logarithmic / linear scaling
On + Left	Play half speed
On + Right	Play 150% speed
On + Play	Play normal speed

Table 11.1: Controls in the split editor

Save dialogue

In the save dialogue it is possible to specify which of the files you want to save and their names. When finished, select "Save" and the files will be written to disk. Note that files can not be overwritten, so filenames that do not exist yet must be chosen. If unsure whether the file already exists simply try to save it. If another file with this name exists the dialogue will return and you can choose another filename

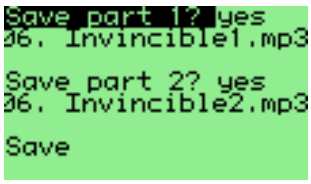

Figure 11.42: The Split Editor's Save Dialogue

Key	Action
Up / Down	Select item
Play	Toggle / edit item
Off	Cancel

Table 11.2: Controls in the save dialogue

Scale

The values in the waveform are scaled according to the settings of the peak meter. These can be altered in the peak meter settings, see section 8.4 (page 53). If extreme minimum or maximum values are set the waveform might be cut off. A minimum setting of -60 dB and a maximum setting of 0 dB are recommended. These settings should be capable of producing useful waveforms for very soft sounds in logarithmic mode (dB). When the editor is used on loud sounds (such as commercial rock or pop music) switching to the linear scale may prove more effective since the logarithmic scale compresses loud noises and makes it more difficult to identify characteristic shapes. Note that it is always possible to toggle between the two scale modes.

11.4.15 Stats

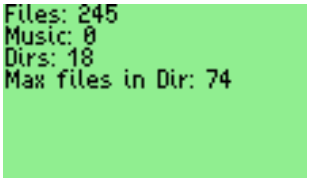

Figure 11.43: The stats-plugin

The stats-plugin simply counts the number of files, music files and directories on your player. Press **Off** to abort counting and exit the plugin. Press it again to quit after counting has finished.

11.4.16 Stopwatch

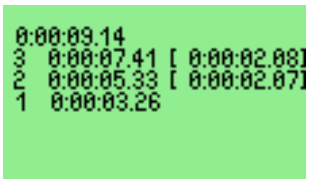

Figure 11.44: Stopwatch

A simple stopwatch program with support for saving times.

Key	Action
Off	Quit Plugin
Play	Start / stop
Left	Reset timer (only when timer is stopped)
On	Take lap time
Up / Down	Scroll through lap times

11.4.17 Text Editor

This plugin allows you to view and edit simple text documents on your DAP. You can view files by using Open with from the Context Menu (see section 4.1.2 (page 21)).

Usage

If you start the Text Editor from the plugin browser you will be greeted with a blank screen. When started from the Open with menu item your file should be shown on the screen. You can now edit the file. The Text Editor is line based. This means you can edit one line at a time using the Virtual Keyboard (see section 4.1.3 (page 23)).

- Move the selection bar to the line you want to edit.
- Edit the highlighted text line or insert a new one using the Item Menu.
- When finished editing exit the Text Editor. You'll be shown a list of save options.

Note: When you have not changed the file the Text Editor will quit immediately.

Key	Action
Right or **On**	Edit Line / Select Character
Left or **Off**	Exit / Abort Editing
F1	Show Item Menu
Long **Play**	Delete Line

12 Advanced Topics

12.1 Customising the User Interface

12.1.1 Getting Extras

Rockbox supports custom fonts. A collection of fonts is available for download in the font package at http://www.rockbox.org/daily.shtml.

12.1.2 Loading Fonts

Rockbox can load fonts dynamically. Simply copy the `.fnt` file to the player and "play" it in the File Browser. If you want a font to be loaded automatically every time you start up, it must be located in the `/.rockbox/fonts` directory and the filename must be at most 24 characters long. You can browse the fonts in `/.rockbox/fonts` under Settings → General Settings → Display → Browse Fonts in the Main Menu.

Warning: Advanced Users Only: Any BDF font file up to 16 pixels high should be usable with Rockbox. To convert from `.bdf` to `.fnt`, use the `convbdf` tool. This tool can be found in the `tools` directory of the Rockbox source code.

12.1.3 Loading Languages

Rockbox can load language files at runtime. Simply copy the `.lng` file *(do not use the .lang file)* to the player and "play" it in the Rockbox directory browser or select Settings → General Settings → Languages from the Main Menu.

Note: If you want a language to be loaded automatically every time you start up, it must be located in the `/.rockbox/langs` directory and the filename must be a maximum of 24 characters long.

If your language is not yet supported and you want to write your own language file find the instructions on the Rockbox website: ☞LangFiles

12.2 Configuring the WPS

12.2.1 WPS – General Info

Description: The WPS or While Playing Screen is the name used to describe the information displayed on the player's screen whilst an audio track is being played. The default WPS is a relatively simple screen displaying Track name, Artist, Album etc. in the default font as a purely text based layout. There are a number of WPS

files included in Rockbox, and you can load one of these at anytime by selecting it in General Settings → Display → Browse .wps files.

Note: "Playing" a `.wps` from the file browser has the same effect.

File Location: Custom WPS files may be located anywhere on the drive. The only restriction is that they must end in `.wps`. When you "play" a `.wps` file, it will be used for future WPS screens, and if the "played" `.wps` file is located in the `/.rockbox/wps` directory, it will be remembered and used after reboot. The `.wps` filename must be no more than 24 characters long for it to be remembered.

12.2.2 WPS – Build Your Own

Quite simply, enter the WPS code in your favourite text editor, Notepad on Windows works fine. When you save it, instead of saving it as a `.txt` file, save it as a `.wps` file. Example: Instead of `Rockbox.txt`, save the file as `Rockbox.wps`. To make sure non english characters display correctly in your WPS you must save the .wps file with UTF-8 character encoding. This can be done in most editors, for example Notepad in Windows 2000 or XP (but not in 9x/ME) can do this. See appendix section B (page 125) for all the tags that are available.

- All characters not preceded by % are displayed as typed.
- Lines beginning with # are comments and will be ignored.
- Maximum file size used is 1600 bytes. If you have a bigger WPS file, only the first part of it will be loaded and used.

Note: Keep in mind that your player resolution is 112x64x1 (with the last number giving the colour depth in bits) when designing your own WPS, or if you use a WPS designed for another target.

Conditional Tags

If/else: Syntax: `%?xx<true|false>`

If the tag specified by "`xx`" has a value, the text between the "<" and the "|" is displayed (the true part), else the text between the "|" and the ">" is displayed (the false part). The else part is optional, so the "|" does not have to be specified if no else part is desired. The conditionals nest, so the text in the if and else part can contain all `%` commands, including conditionals.

Enumerations: Syntax: `%?xx<alt1|alt2|alt3|...|else>`

For tags with multiple values, like Play status, the conditional can hold a list of alternatives, one for each value the tag can have. Example enumeration:

Example

```
%?mp<Stop|%Play|Pause|Ffwd|Rew>
```

The last else part is optional, and will be displayed if the tag has no value. The WPS parser will always display the last part if the tag has no value, or if the list of alternatives is too short.

Next Song Info

You can display information about the next song – the song that is about to play after the one currently playing (unless you change the plan).

If you use the upper-case versions of the three tags: `F`, `I` and `D`, they will instead refer to the next song instead of the current one. Example: `%Ig` is the genre name used in the next song and `%Ff` is the mp3 frequency.

Note: The next song information *will not* be available at all times, but will most likely be available at the end of a song. We suggest you use the conditional display tag a lot when displaying information about the next song!

Alternating Sublines

It is possible to group items on each line into 2 or more groups or "sublines". Each subline will be displayed in succession on the line for a specified time, alternating continuously through each defined subline.

Items on a line are broken into sublines with the semicolon '`;`' character. The display time for each subline defaults to 2 seconds unless modified by using the '`%t`' tag to specify an alternate time (in seconds and optional tenths of a second) for the subline to be displayed.

Subline related special characters and tags:

`;` Split items on a line into separate sublines

`%t` Set the subline display time. The '`%t`' is followed by either integer seconds (`%t5`), or seconds and tenths of a second (`%t3.5`).

Each alternating subline can still be optionally scrolled while it is being displayed, and scrollable formats can be displayed on the same line with non-scrollable formats (such as track elapsed time) as long as they are separated into different sublines. Example subline definition:

Example

```
%s%t4%ia;%s%it;%t3%pc %pr : Display id3 artist for 4 seconds,
                            Display id3 title for 2 seconds,
                            Display current and remaining track time
                            for 3 seconds,
                            repeat...
```

Conditionals can be used with sublines to display a different set and/or number of sublines on the line depending on the evaluation of the conditional. Example subline with conditionals:

Example
```
%?it<%t8%s%it|%s%fn>;%?ia<%t3%s%ia|%t0>
```

The format above will do two different things depending if ID3 tags are present. If the ID3 artist and title are present:

- Display id3 title for 8 seconds,
- Display id3 artist for 3 seconds,
- repeat...

If the ID3 artist and title are not present:

- Display the filename continuously.

Note that by using a subline display time of 0 in one branch of a conditional, a subline can be skipped (not displayed) when that condition is met.

Using Images

You can have as many as 52 images in your WPS. There are various ways of displaying images:

1. Load and always show the image, using the `%x` tag
2. Preload the image with `%xl` and show it with `%xd`. This way you can have your images displayed conditionally.

Example on bitmap preloading and use:

Example
```
%x|a|static_icon.bmp|50|50|
%xl|b|rep_off.bmp|16|64|
%xl|c|rep_all.bmp|16|64|
%xl|d|rep_one.bmp|16|64|
%xl|e|rep_shuffle.bmp|16|64|
%?mm<%xdb|%xdc|%xdd|%xde>
```

Four images at the same x and y position are preloaded in the example. Which image to display is determined by the `%mm` tag (the repeat mode).

Example File

Example
```
%s%?in<%in - >%?it<%it|%fn> %?ia<[%ia%?id<, %id>]>
%pb%pc/%pt
```

That is, “tracknum – title [artist, album]”, where most fields are only displayed if available. Could also be rendered as “filename” or “tracknum – title [artist]”.

12.3 Managing Rockbox Settings

12.3.1 Introduction to `.cfg` Files.

Rockbox allows users to store and load multiple settings through the use of configuration files. A configuration file is simply a text file with the extension `.cfg`.

A configuration file may reside anywhere on the disk. Multiple configuration files are permitted. So, for example, you could have a `car.cfg` file for the settings that you use while playing your jukebox in your car, and a `headphones.cfg` file to store the settings that you use while listening to your player through headphones.

See section 12.3.2 (page 118) below for an explanation of the format for configuration files. See section 12.3.3 (page 119) for an explanation of how to create, edit and load configuration files.

12.3.2 Specifications for `.cfg` Files.

The Rockbox configuration file is a plain text file, so once you use the Save .cfg file option to create the file, you can edit the file on your computer using any text editor program. See Appendix section C (page 132) for available settings. Configuration files use the following formatting rules:

1. Each setting must be on a separate line.
2. Each line has the format "setting: value".
3. Values must be within the ranges specified in this manual for each setting.
4. Lines starting with # are ignored. This lets you write comments into your configuration files.

Example of a configuration file:

Example

```
Example configuration file
volume: 70
bass: 11
treble: 12
balance: 0
time format: 12hour
volume display: numeric
show files: supported
wps: /.rockbox/car.wps
lang: /.rockbox/afrikaans.lng
```

Note: As you can see from the example, configuration files do not need to contain all of the Rockbox options. You can create configuration files that change only certain settings. So, for example, supppose you typically use the player at one volume in the car, and another when using headphones. Further, suppose you like to use an inverse LCD when

you are in the car, and a regular LCD setting when you are using headphones. You could create configuration files that control only the volume and LCD settings. Create a few different files with different settings, give each file a different name (such as `car.cfg`, `headphones.cfg`, etc.), and you can then use the Browse .cfg files option to quickly change settings.

A special case configuration file can be used to force a particular setting or settings every time Rockbox starts up (e.g. to set the volume to a safe level). Format a new configuration file as above with the required setting(s) and save it into the `/.rockbox` directory with the filename `fixed.cfg`.

12.3.3 The Manage Settings menu

The Manage Settings menu can be found in the Main Menu. The Manage Settings menu allows you to save and load `.cfg` files. The Manage Settings menu also allows you to load or save different firmware versions.

Browse .cfg Files Opens the file browser in the `/.rockbox` directory and displays all `.cfg` (configuration) files. Selecting a `.cfg` file will cause Rockbox to load the settings contained in that file. Pressing **Left** will exit back to the Manage Settings menu. See the Write .cfg files option on the Manage Settings menu for details of how to save and edit a configuration file.

Reset Settings This wipes the saved settings in the player and resets all settings to their default values.

Save .cfg File This option writes a `.cfg` file to your player's disk. The configuration file has the `.cfg` extension and is used to store all of the user settings that are described throughout this manual.

Hint: Use the Save .cfg File feature (Main Menu → General Settings) to save the current settings, then use a text editor to customize the settings file. See Appendix section C (page 132) for the full reference of available options.

Save Sound Settings This option writes a `.cfg` file to your player's disk. The configuration file has the `.cfg` extension and is used to store all of the sound related settings.

Save Theme Settings This option writes a `.cfg` file to your player's disk. The configuration file has the `.cfg` extension and is used to store all of the theme related settings.

12.4 Firmware Loading

When your player powers on, it loads the Archos firmware in ROM, which automatically checks your player's root directory for a file named `ajbrec.ajz`. Note that Archos firmware can only read the first ten characters of each filename in this process, so do not

rename your old firmware files with names like `ajbrec.ajz.old` and so on, because it is possible that the player will load a file other than the one you intended.

12.4.1 Using ROLO (Rockbox Loader)

Rockbox is able to load and start another firmware file without rebooting. You just "play" a file with the extension `.ajz`. This can be used to test new firmware versions without deleting your current version.

12.5 Rockbox in Flash

12.5.1 Introduction

When you bought your Recorder, it came with the Archos firmware in flash ROM. When you power on your player, this Archos firmware starts, and then loads an updated firmware from disk if present (`ajbrec.ajz`). An ordinary Rockbox installation only replaces the on-disk firmware, leaving the flash ROM contents intact. That means the Archos firmware still controls the boot process.

The main reason to change this is to improve the startup time of your player. The Archos bootloader is rather slow. With Rockbox in flash, your player will boot much faster, typically in three to five seconds. Furthermore you might prefer a clean Rockbox environment, with as little remnants of the Archos software as possible.

Warning: Flashing your player is somewhat dangerous, like programming a mainboard *BIOS*, *CD/DVD* drive firmware, mobile phone, etc. If the power fails, the chip breaks while programming or most of all the programming software malfunctions, you'll have a dead box. We take no responsibility of any kind, you do that at your own risk. However, we tried as carefully as possible to bulletproof this code. There are a lot of sanity checks. If any of them fails, it will not program.

There's an ultimate safety net to bring back boxes with even completely garbled flash content: the *UART* boot mod, which in turn requires the *serial* mod. With that it's possible to reflash independently from the outside, even if the flash ROM is completely erased. This won't work if you have one of the rare "ROMless" boxes. These have no boot ROM and boot directly from flash. If the first ≈2KB of the flash ROM are flashed ok, *Minimon* can be used for the same purpose.

12.5.2 Terminology and Basic Operation

Firmware: The flash ROM contents as a whole.

Image: One operating software started from there.

The replacement firmware contains a bootloader and two images. The first image is the *permanent* rescue software, to be used in case something is wrong with the second (main) image. In current firmware files this first image contains *Bootbox* (see wiki for details). The second image is what is booted by default. The current firmware files

contain a copy of Rockbox 3.1 in the main image. It can easily be updated/replaced later.

The bootloader allows to select which image to run. Pressing **F1** at boot selects the first image. **F2** selects the second image, which will also be booted if you don't press any button. The button mapping is only there for completeness. **F3** selects the built-in serial monitor called *Minimon*. You should know this in case you invoke it by accident. Minimon won't display anything on the screen. To get out of it, perform a hardware shutdown of your player.

12.5.3 Initial Flashing Procedure

You only need to perform this procedure the first time you flash your Recorder. You may also want to perform it in case the update procedure for the second image recommends it. In the latter case do not perform the steps listed under "Preparation".

Preparation

First, check whether your Recorder is flashable at all. Select System → Debug (Keep Out!) → View HW Info. Check the values in the line starting with "Flash:". If it shows question marks after "M=" and "D=", you're out of luck, your player is not flashable without modifying the hardware. You can stop here. Sorry.

If your player is flashable, you should perform a backup of the current flash ROM contents, in case you want to restore it later. Select System → Debug (Keep Out!) → Dump ROM contents. You'll notice a few seconds of disk activity. When you connect your player to the PC afterwards, you'll find two files in the root of your player. Copy the 256KB-sized file named `internal_rom_2000000-203FFFF.bin` to a safe place.

Flashing

1. Download the correct package for your player from http://download.rockbox.org/bootloader/archos/. It is named `flash-<model>-<version>.zip`. The current packages are v2.

2. Unzip the flash package to the root of your player. This will extract two files to the root, `firmware_<model>.bin` and `firmware_<model>_norom.bin`. (The <model> part is slighty different from that in the .zip file name.) The flash plugin will select the correct one for your player. Now safely disconnect USB.

3. Make sure your batteries are in good shape and fully charged. Flashing doesn't need more power than normal operation, but you don't want your player to run out of power while flashing.

4. Select Plugins → Applications, and run the `firmware_flash` plugin. It will tell you about your flash and which file it is going to program. After pressing **F1** it will check the file. If the file is OK, pressing **F2** will give you a big warning. If

we still didn't manage to scare you off, you need to press **F3** to actually program and verify. The programming takes just a few seconds.

5. In the unlikely event that the programming or verify steps should give you any error, *do not switch off the box!* Otherwise you'll have seen it working for the last time. While Rockbox is still in RAM and operational, we could upgrade the plugin via USB and try again. If you switch it off, it's gone.

Note: After successful flashing you may delete the `.bin` files from the root of your player.

Note: There are no separate flash packages for players modified to have 8MB of RAM. You need to use the corresponding package for non-modified Recorder. You should then install a rockbox image that makes use of all available RAM as described in the following section.

12.5.4 Updating the Rockbox Image in Flash

When Rockbox is booted from flash, it does not check for an updated firmware on disk. This is one of the reasons why it boots faster than the Archos firmware. It means that whenever you update Rockbox, you also need to update the image in the flash. This is a simple and safe procedure:

1. Download (or build) the Rockbox build you want to use, and unzip it to the root of your player. Safely disconnect USB.
2. ROLO into the new rockbox version.
3. Go to the file browser, and enter the `.rockbox` directory (you might need to set the File View option to All.)
4. Play the file `rockbox.ucl`, and follow the instructions. The plugin handling this is `rockbox_flash`, a viewer plugin.

12.5.5 Restoring the Original Flash ROM Contents

In case you ever want to restore the original flash contents, you will need the backup file. The procedure is very similar to initial flashing, with the following differences:

1. Check that you do not have any `firmware_*.bin` files in your player's root.
2. Select Plugins → Applications, and run the `firmware_flash` plugin. Write down the filename it displays in the first screen, then exit the plugin.
3. Connect USB, and copy the flash ROM backup file to the root of your player. *Only use the backup file from that very box, otherwise you're asking for trouble!* Rename the file so that it matches the name requested by the `firmware_flash` plugin. Safely disconnect USB.

Now follow the instructions given for initial flashing, starting with step 3.

A File formats

A.1 Supported file formats

Icon	File Type	Extension	Action when selected
	Directory	*none*	The browser enters that directory
	Audio file	`.mp2, .mp3`	Rockbox takes you to the WPS and starts playing the file
	Cuesheet	`.cue`	View a cuesheet file
	Wave Audio File	`.wav`	Play a WAV file
	Playlist	`.m3u, .m3u8`	Rockbox loads the playlist and starts playing the first file
	Rockbox firmware	`.ajz`	ROLO will load the new firmware
	While Playing Screen	`.wps`	The new WPS display configuration will be loaded
	Language File	`.lng`	Loads a language file
	Text File	`.txt`	This will display the text file using Rockbox text browser plugin
	Configuration File	`.cfg`	The settings file will be loaded
	Font	`.fnt`	This font will replace the current one
	Plugin	`.rock`	Starts a Rockbox plugin
	Flash Image	`.ucl`	This Rockbox image will be flashed into the ROM
	Chip8 game	`.ch8`	Play a Chip8 game
	Image	`.jpg`	View a JPEG image
	Rockbox Video	`.rvf`	View a movie (Rockbox format)

B WPS Tags

B.1 Status Bar

Tag	Description
%we	Status Bar Enabled
%wd	Status Bar Disabled

These tags override the player setting for the display of the status bar. They must be noted on their own line.

B.2 ID3 Info

Tag	Description
%ia	ID3 Artist
%ic	ID3 Composer
%id	ID3 Album Name
%ig	ID3 Genre Name
%in	ID3 Track Number
%it	ID3 Track Title
%iv	ID3 Version (1.0, 1.1, 2.2, 2.3, 2.4 or empty if no id3 tag)
%iy	ID3 Year

Remember that this information is not always available, so use the conditionals to show alternate information in preference to assuming.

B.3 Power Related Information

Tag	Description
%bl	Show numeric battery level in percent. Can also be used in a conditional: %?bl<-1|0|1|2|...|N> Where the -1 value is used when the battery level isn't known (it usually is).
%bv	Show the battery level in volts
%bt	Show estimated battery time left
%bp	"p" if the charger is connected (only on targets that can charge batteries)
%bc	"c" if the unit is currently charging the battery (only on targets that have software charge control or monitoring)
%bs	Sleep timer. Shows the remaining time if the sleeptimer is set

B.4 File Info

Tag	Description
%fb	File Bitrate (in kbps)
%fc	File Codec (e.g. "MP3" or "FLAC"). This tag can also be used in a conditional tag, %?fc<mp1|mp2|mp3|aiff|wav|vorbis|flac|mpc|a52|wavpack|alac-|aac|shn|sid|adx|unknown>. The codec order is as follows: MP1, MP2, MP3, AIFF, WAV,Ogg Vorbis (OGG), FLAC, MPC, AC3, WavPack (WV), ALAC, AAC,Shorten (SHN), SID, ADX, NSF, Speex, SPC, APE.
%ff	File Frequency (in Hz)
%fm	File Name
%fn	File Name (without extension)
%fp	File Path
%fs	File Size (In Kilobytes)
%fv	"(avg)" if variable bit rate or "" if constant bit rate
%d1	First directory from end of file path.
%d2	Second directory from end of file path.
%d3	Third directory from end of file path.

Example for the %dN commands: If the path is "/Rock/Kent/Isola/11 - 747.mp3", %d1 is "Isola", %d2 is "Kent" ... You get the picture.

B.5 Playlist/Song Info

Tag	Description
%pb	Progress Bar This will replace the entire line with a progress bar. You can set the height, position and width of the progressbar (in pixels): %pb|height|leftpos|rightpos|toppos|
%px	Percentage Played In Song
%pc	Current Time In Song
%pe	Total Number of Playlist Entries
%pm	Peak Meter. The entire line is used as volume peak meter.
%pn	Playlist Name (Without path or extension)
%pp	Playlist Position
%pr	Remaining Time In Song
%ps	Shuffle. Shows 's' if shuffle mode is enabled.
%pt	Total Track Time
%pv	Current volume (x dB). Can also be used in a conditional: %?pv<0|1|2|...|N>

B.6 Runtime Database

Tag	Description
%rp	Song playcount
%rr	Song rating (0-10). This tag can also be used in a conditional tag, %?rr<0|1|2|3|4|5|6|7|8|9|10>

B.7 Virtual LED

Tag	Description
%lh	"h" if the hard disk is accessed

B.8 Repeat Mode

Tag	Description
%mm	Repeat mode, 0-4, in the order: Off, All, One, Shuffle , A-B

Example: %?mm<Off|All|One|Shuffle|A-B>

B.9 Playback Mode Tags

Tag	Description
%mp	Play status, 0-4, in the order: Stop, Play, Pause, Fast forward, Rewind

Example: %?mp<Stop|Play|Pause|Ffwd|Rew>

B.10 Changing Volume

Tag	Description
%mv[t]	"v" if the volume is being changed

The tag produces the letter "v" while the volume is being changed and some amount of time after that, i.e. after the volume button has been released. The optional parameter t specifies that amout of time. If it is not specified, 1 sec is assumed.

The tag can be used as the switch in a conditional tag to display different things depending on whether the volume is being changed. It can produce neat effects when used with conditional viewports.

Example: %?mv2.5<Volume changing|%pv>

The example above will display the text "Volume changing" if the volume is being changed and 2.5 secs after the volume button has been released. After that, it will display the volume value.

B.11 Settings

Tag	Description
%St|<setting name>|	Display the value of any Rockbox setting

Example: Can be used as a simple tag %St|skip length| or with conditionals %?St|eq enabled|<Equalizer is enabled|Equalizer is disabled>.

B.12 Images

Tag	Description
%P|filename.bmp|	Load a Progress bar image for the WPS. Use %pb tag to show the progress bar
%x|n|filename|x|y|	Load and display an image n: image ID (a-z and A-Z) for later referencing in %xd filename: filename relative to /.rockbox/ and including .bmp x: x coordinate y: y coordinate.
%xl|n|filename|x|y|[nimages|]	Preload an image for later display (useful for when your images are displayed conditionally) n: image ID (a-z and A-Z) for later referencing in %xd filename: filename relative to /.rockbox/ and including .bmp x: x coordinate y: y coordinate. nimages: (optional) number of sub-images (tiled vertically, of the same height) contained in the bitmap. Default is 1.
%xdn[i]	Display a preloaded image n: image ID (a-z and A-Z) as it was specified in %x or %xl i: (optional) number of the sub-image to display (a-z for 1-26 and A-Z for 27-52). By default the first (i.e. top most) sub-image will be used.

Examples:

1. Load and display the image `/.rockbox/bg.bmp` with ID "a" at 37, 109:
   `%x|a|bg.bmp|37|109|`
2. Load a bitmap strip containing 5 volume icon images (all the same size) with image ID "M", and then reference the individual sub-images in a conditional:
   `%xl|M|volume.bmp|134|153|5|`
   `%?pv<%xdMa|%xdMb|%xdMc|%xdMd|%xdMe>`

Note:

- The images must be in a rockbox compatible format (1 bit per pixel BMP)
- The image tag must be on its own line
- The ID is case sensitive, giving 52 different ID's
- The size of the LCD screen for each player varies. See table below for appropriate sizes of each device. The x and y coordinates must repect each of the players' limits.

B.13 Alignment

Tag	Description
`%al`	Text is left aligned
`%ac`	Text is center aligned
`%ar`	Text is right aligned

All alignment tags may be present in one line, but they need to be in the order left – center – right. If the aligned texts overlap, they are merged.

B.14 Conditional Tags

Tag	Description
`%?xx<true|false>`	If / Else: Evaluate for true or false case
`%?xx<alt1|alt2|alt3|...|else>`	Enumerations: Evaluate for first / second / third / ... / last condition

B.15 Real Time Clock

Tag	Description
%cd	Day of month
%ce	Zero padded day of month
%cH	Zero padded hour from 00 to 24
%ck	Hour from 0 to 24
%cI	Zero padded hour from 12 to 12
%cl	Hour from 12 to 12
%cm	Month
%cM	Minutes
%cS	Seconds
%cy	2-digit year
%cY	4-digit year
%cP	Capital AM/PM
%cp	Lowercase am/pm
%ca	Weekday name
%cb	Month name
%cu	Day of week from 1 to 7, 1 is Monday
%cw	Day of week from 0 to 6, 0 is Sunday

B.16 Other Tags

Tag	Description
%%	Display a '%'
%<	Display a '<'
%|	Display a '|'
%>	Display a '>'
%;	Display a ';'
%s	Indicate that the line should scroll. Can occur anywhere in a line (given that the text is displayed; see conditionals above). You can specify up to 10 scrolling lines. Scrolling lines can not contain dynamic content such as timers, peak meters or progress bars.

C Config file options

Setting	Allowed Values	Unit
volume	-100 -to +12	dB
bass	-15 to +15	dB
treble	-15 to +15	dB
balance	-100 to +100	%
channels	stereo, mono, custom, mono left, mono right, karaoke	N/A
stereo_width	0 to 250	%
shuffle	on, off	N/A
repeat	off, all, one, shuffle, ab	N/A
play selected	on, off	N/A
party mode	on, off	N/A
scan min step	1, 2, 3, 4, 5, 6, 8, 10, 15, 20, 25, 30, 45, 60	seconds
seek acceleration	very fast, fast, normal, slow, very slow	N/A
antiskip	5s, 15s, 30s, 1min, 2min, 3min, 5min, 10min	N/A
volume fade	on, off	N/A
sort case	on, off	N/A
show files	all, supported, music, playlists	N/A
show filename exts	off, on, unknown, view_all	N/A
follow playlist	on, off	N/A
playlist viewer icons	on, off	N/A
playlist viewer indices	on, off	N/A
playlist viewer track display	track name,full path	N/A
recursive directory insert	on, off, ask	N/A
scroll speed	1 to 25	Hz
scroll delay	0 to 2500	ms
scroll step		pixels
screen scroll step		pixels
Screen Scrolls Out Of View	on, off	N/A
bidir limit	0 to 200	% screen
scroll paginated	on, off	N/A
hold_lr_for_scroll_in_list	on, off	N/A
show path in browser	off, current directory, full path	N/A

Setting	Allowed Values	Unit
contrast	0 to 63	N/A
backlight timeout	off, on, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 45, 60, 90, 120	seconds
backlight timeout plugged	off, on, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 45, 60, 90, 120	seconds
backlight filters first keypress	on, off	N/A
backlight on button hold	normal, off, on	N/A
caption backlight	on, off	N/A
brightness		N/A
disk spindown	3 to 254	seconds
battery capacity		mAh
car adapter mode	on, off	N/A
idle poweroff	off, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 30, 45, 60	minutes
max files in playlist	1000 - 32000	N/A
max files in dir	50 - 10000	N/A
lang	/path/filename.lng	N/A
wps	/path/filename.wps	N/A
autocreate bookmarks	off, on	N/A
autoload bookmarks	off, on	N/A
use most-recent-bookmarks	off, on	N/A
pause on headphone unplug	off, pause, pause and resume	N/A
rewind duration on pause	0 to 15	seconds
disable autoresume if phones not present	off, on	N/A
Last.fm Logging	off, on	N/A
talk dir	off, number, spell	N/A
talk dir clip	off, on	N/A
talk file	off, number, spell	N/A
talk file clip	off, on	N/A
talk filetype	off, on	N/A
talk menu	off, on	N/A
Announce Battery Level	off, on	N/A
sort files	alpha, oldest, newest, type	N/A
sort dirs	alpha, oldest, newest	N/A
tagcache_autoupdate	on, off	N/A
warn when erasing dynamic playlist	on, off	N/A
cuesheet support	on, off	N/A
folder navigation	off, on, random	N/A
gather runtime data	off, on	N/A
skip length	track, 1, 2, 3, 4, 5, 10, 15	minutes

Setting	Allowed Values	Unit
start in screen	previous, root, files, db, wps, menu, recording, bookmarks	N/A
playlist catalog directory	/path/to/dir	N/A
loudness	0 to 17	N/A
superbass	on, off	N/A
auto volume	off, 20ms, 2s, 4s, 8s	seconds
mdb enable	on,off	N/A
mdb strength	0 to 127	dB
mdb harmonics	0 to 100	%
mdb center	20 to 300	Hz
mdb shape	50 to 300	Hz
peak meter release	1 to 126	?
peak meter hold	off, 200ms, 300ms, 500ms, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 30, 1min	N/A
peak meter clip hold	on, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 45, 60, 90, 2min, 3min, 5min, 10min, 20min, 45min, 90min	N/A
peak meter busy	on, off	N/A
peak meter dbfs	on, off	on: dbfs, off: linear
peak meter min	0 to 89 (dB) or 0 to 100 (%)	dB or %
peak meter max	0 to 89 /(dB) or 0 to 100 (%)	dB or %
statusbar	on, off	N/A
scrollbar	on, off	N/A
volume display	graphic, numeric	N/A
battery display	graphic, numeric	N/A
font	/path/filename.fnt	N/A
kbd	/path/filename.kbd	N/A
invert	on, off	N/A
flip display	on, off	N/A
selector type	pointer, bar (inverse)	N/A
show icons	on, off	N/A
iconset	/path/filename.bmp	N/A
viewers iconset	/path/filename.bmp	N/A
time format	12hour, 24hour	N/A
rec quality	0 to 7	0: small size, 7: high quality
rec frequency	48, 44, 32, 24, 22, 16	kHz
rec source	mic, line, spdif	N/A
rec channels	mono, stereo	N/A
rec mic gain	0 to 15	N/A
rec left gain	0 to 15	N/A
rec right gain	0 to 15	N/A

Setting	Allowed Values	Unit
editable recordings	off,on	N/A
rec timesplit	off, 0:05, 0:10, 0:15, 0:30, 1:00, 2:00, 4:00, 6:00, 8:00, 16:00, 24:00	h:mm
pre-recording time	off, 1 to 30	seconds
rec directory	/path/to/dir	N/A

D User feedback

D.1 Bug reports

If you experience inappropriate performance from any supported feature, please file a bug report on our web page. Do not report missing features as bugs, instead file them as feature ideas (see below).

For open bug reports refer to http://www.rockbox.org/tracker/index.php?type=2

D.1.1 Rules for submitting new bug reports

1. Check that the bug has not already been reported
2. Always include the following information in your bug report:

- Which exact player you have.
- Which exact Rockbox version you are using (Menu->Info -> Version)
- A step-by-step description of what you did and what happened
- Whether the problem is repeatable or a one-time occurrence
- All relevant data regarding the problem, such as playlists, MP3 files etc. (IMPORTANT!)

D.2 Feature ideas

To suggest an idea for a feature or to read those made by others, see http://forums.rockbox.org/index.php?board=49.0. Please keep in mind that this forum is for the discussion of feature ideas - they are not requests and there is no guarantee they will be acted upon.

D.2.1 Rules for submitting a new feature idea

1. Check that the feature has not already been suggested. Duplicates are really boring!
2. Check that the feature has not already been implemented. Download the latest current/daily build and/or search the mail list archive.
3. Check that the feature is possible to implement (see section D.2.2 (page 137)).

D.2.2 Features we will not implement

This is a list of Feature Requests we get repeatedly that we simply cannot do. View it as the opposite of a TODO!

- Record to WAV (uncompressed) or MP3pro format!
  The recording hardware (the MAS) does not allow us to do this
- Crossfade between tracks!
  Crossfading would require two mp3 decoders, and we only have one. This is not possible.
- Support MP3pro, WMA or other sound format playback!
  The mp3-decoding hardware can only play MP3. We cannot make it play other sound formats.
- Converting OGG → MP3
  The mp3-decoding hardware cannot decode OGG. It can be reprogrammed, but there is too little memory for OGG and we have no documentation on how to program the MAS' DSP. Doing the conversion with the CPU is impossible, since a 12MHz SH1 is far too slow for this daunting task.
- Archos Multimedia support!
  The Archos Multimedia is a completely different beast. It is an entirely different architecture, different CPU and upgrading the software is done a completely different way. We do not wish to venture into this. Others may do so. We will not.
- Multi-band (or graphic) equaliser
  We cannot access information for that kind of visualisation from the MP3 decoding hardware.
- CBR recording!
  The MP3 encoding hardware does not allow this.
- Change tempo of a song without changing pitch!
  The MP3 decoding hardware does not allow this.
- Graphic frequency (spectrum analyser!)
  We cannot access the audio waveform from the MP3 decoder so we cannot analyse it. Even if we had access to it, the CPU would probably be too slow to perform the analysis anyway.
- Cool sound effects!
  Adding new sound effects requires reprogramming the MAS chip, and we cannot do that. The MAS chip is programmable, but we have no access to the chip documentation.

- Interfacing with other USB devices (like cameras) or 2 player games over USB
  The USB system demands that there is a master that talks to a slave. The player can only serve as a slave, as most other USB devices such as cameras can. Thus, without a master no communication between the slaves can take place. If that is not enough, we have no ways of actually controlling the communication performed over USB since the USB circuit in the player is strictly made for disk-access and does not allow us to play with it the way we'd need for any good communication to work.

- Support other file systems than FAT32 (like NTFS or ext2 or whatever)!
  No. Rockbox needs to support FAT32 since it can only start off a FAT32 partition (since that is the only way the ROM can load it), and addingsupport for more file systems will just take away valuable ram for unnecessary features. You can partition your player fine, just make sure the first one is FAT32 and then make the other ones whatever file system you want. Just do not expect Rockbox to understand them.

- Add scandisk-like features!
  It would be a very slow operation that would drain the batteries and take a lot of useful ram for something that is much better and faster done when connected to a host computer.

E Changelog

E.1 What is new since v3.0?

E.1.1 New features

⋆ 2008-12-09: Album Art resizing.
⋆ 2008-12-09: FM radio support on Gigabeat S.
⋆ 2008-11-26: Software controlled backlight fading for targets without hardware fading (e200v1, c200v1, X5, Cowon D2 and H300)

E.1.2 Enhancements

⋆ 2008-12-01: Several new tags were added to the WPS syntax
⋆ 2008-11-20: The build system received a major overhaul
⋆ 2008-11-03: Customisable options in the QuickScreen
⋆ 2008-10-25: Calendar plugin on all RTC equipped targets
⋆ 2008-10-08: Configurable mono recording mode
⋆ 2008-10-07: Support for version 1.1 scrobbler log files
⋆ 2008-10-03: APE playback optimized
⋆ 2008-09-21: MP3 playback optimized for dual-core targets

E.2 What is new since v2.5?

E.2.1 New features

⋆ 2008-07-07: Added keybox plugin
⋆ 2008-05-04: Added study mode
⋆ 2008-04-23: Lamp (originally "flashlight") plugin
⋆ 2008-03-23: New bitmap strips feature in the WPS
⋆ 2008-03-21: Viewport tag added for WPS
⋆ 2008-03-18: The Olympus m:robe 100 is now a supported target
⋆ 2007-12-09: PictureFlow: A nice animated visualization for album art
⋆ 2007-11-26: Matrix Demo
⋆ 2007-11-11: Rockbox can now display album art
⋆ 2007-09-06: Sound on Sansa c200
⋆ 2007-09-04: The SanDisk Sansa e200R models are now Rockboxed!
⋆ 2007-08-06: Make several splashes and confirmation screens speak
⋆ 2007-08-03: iPod 3rd gen is now officially a supported target
⋆ 2007-08-02: Superdom game

- ⋆ 2007-07-27: Sound on iPod 2nd Gen
- ⋆ 2007-07-25: Jackpot support for bitmap targets
- ⋆ 2007-06-30: Reversi game
- ⋆ 2007-06-29: Rocklife plugin
- ⋆ 2007-06-28: Maze game
- ⋆ 2007-06-17: Custom filetype colour feature introduced
- ⋆ 2007-05-23: The 80GB Ipod Video is now supported by Rockbox
- ⋆ 2007-04-09: WAV file viewer
- ⋆ 2007-03-11: Sound on the Sansa e200
- ⋆ 2007-03-04: Rockbox runs and plays music on the iAudio M5
- ⋆ 2007-03-01: Add the Rockbox Menu
- ⋆ 2007-02-16: Chopper game
- ⋆ 2007-02-14: Cuesheet support
- ⋆ 2007-02-14: Icons in the menus
- ⋆ 2007-02-10: Album Artist and Comment Tag Support
- ⋆ 2007-02-09: Speex Codec Support
- ⋆ 2007-01-31: Invadrox, a Space Invaders clone
- ⋆ 2007-01-16: BlackJack plugin
- ⋆ 2007-01-02: Mazezam, a puzzle game for all bitmap lcd targets
- ⋆ 2006-12-29: Toshiba Gigabeat X and F series support
- ⋆ 2006-11-30: File properties in context menu
- ⋆ 2006-11-06: Samplerate and format selection added to recording settings. Encoders can be configured individually on a menu specific to the encoder in the recording menu
- ⋆ 2006-11-06: Pitch adjustment in semitone steps
- ⋆ 2006-10-27: Audio dithering option
- ⋆ 2006-10-19: last.fm (audioscrobbler) logging support
- ⋆ 2006-10-05: FM radio region setting
- ⋆ 2006-09-15: ZX spectrum emulator plugin - zxbox
- ⋆ 2006-08-28: Encoder Codec Interface for recording with additional FM recording support
- ⋆ 2006-08-07: Initial version of mpegplayer plugin
- ⋆ 2006-07-19: Rockpaint plugin
- ⋆ 2006-07-18: Playlist catalog
- ⋆ 2006-04-19: Rockbox is functional and plays audio on the iPod Mini 1G
- ⋆ 2006-03-30: Rockbox is functional and plays audio on the iPod Mini 2G
- ⋆ 2006-03-28: DOOM
- ⋆ 2006-03-28: Sound on the iAudio X5 , X5L and X5V
- ⋆ 2006-03-26: Experimental WAV playback plugin for Archos Recorder/Ondio
- ⋆ 2006-03-26: Initial version of Tag Cache
- ⋆ 2006-03-20: Bubbles, a bubble game
- ⋆ 2006-03-19: Tetrox, a Tetris clone
- ⋆ 2006-03-12: Xobox, a Xonix/Qix clone
- ⋆ 2006-03-11: Pacbox, a pacman arcade machine emulator

- ⋆ 2006-02-22: "Chessbox" chess game plugin
- ⋆ 2006-02-13: iPod 5G audio playback
- ⋆ 2006-01-28: Color bitmap support in the WPS (for color models)
- ⋆ 2006-01-23: Brickmania game plugin
- ⋆ 2005-12-06: Unicode support
- ⋆ 2005-11-05: Jewels game plugin - a Bejeweled clone.

E.2.2 Enhancements

- ⋆ 2008-08-06: Redesigned recording screen
- ⋆ 2008-02-23: New default theme: cabbie 2.0
- ⋆ 2008-01-04: All new greyscale library with improved performance
- ⋆ 2007-08-08: Added support for grouping tags
- ⋆ 2007-08-06: Organise the plugins into categories
- ⋆ 2007-08-05: Voice file changes. Older voices no longer work, now all voice files are target-specific.
- ⋆ 2007-08-03: Added support for the disc number tag
- ⋆ 2007-04-04: WPS tokenizer: Rewritten WPS code
- ⋆ 2007-03-20: rockbox.* file moved inside /.rockbox directory
- ⋆ 2007-01-23: Settings are now saved to /.rockbox/config.cfg and the hidden config sector is not used anymore
- ⋆ 2006-11-29: Playlists are saved with the extension .m3u8, extension .m3u is now read using the chosen codepage
- ⋆ 2006-09-16: New scheduler. Audio playback is now prioritised over other tasks
- ⋆ 2006-09-02: Enhanced statusbar in recording screen
- ⋆ 2006-08-15: Support for displaying the path in the file browser
- ⋆ 2006-02-07: Equalizer configuration for software codec platforms
- ⋆ 2006-02-06: The Rockbox manual is available in LaTeXformat
- ⋆ 2005-12-05: New wps' added. Engineeer2, marquee, and DancePuffDuo

E.2.3 New codecs supported

Lossy codecs

- ⋆ Ogg/vorbis
- ⋆ MPC
- ⋆ A/52 (AC3)
- ⋆ AAC (MP4)
- ⋆ WMA
- ⋆ ADX
- ⋆ Speex

Lossless codecs

- ⋆ WAV

- ⋆ AIFF
- ⋆ FLAC
- ⋆ ALAC
- ⋆ Wavpack
- ⋆ Shorten
- ⋆ Monkey's Audio

Other codecs

- ⋆ SID
- ⋆ MOD
- ⋆ NSF, NSFE
- ⋆ SPC
- ⋆ MIDI
- ⋆ SAP

F Credits

People that have contributed to the project, one way or another. Friends!

▶ Björn Stenberg ▶ Linus Nielsen Feltzing ▶ Andy Choi ▶ Andrew Jamieson ▶ Paul Suade ▶ Joachim Schiffer ▶ Daniel Stenberg ▶ Alan Korr ▶ Gary Czvitkovicz ▶ Stuart Martin ▶ Felix Arends ▶ Ulf Ralberg ▶ David Härdeman ▶ Thomas Saeys ▶ Grant Wier ▶ Julien Labruyére ▶ Nicolas Sauzede ▶ Robert Hak ▶ Dave Chapman ▶ Stefan Meyer ▶ Eric Linenberg ▶ Tom Cvitan ▶ Magnus Öman ▶ Jerome Kuptz ▶ Julien Boissinot ▶ Nuutti Kotivuori ▶ Heikki Hannikainen ▶ Hardeep Sidhu ▶ Markus Braun ▶ Justin Heiner ▶ Magnus Holmgren ▶ Bill Napier ▶ George Styles ▶ Mats Lidell ▶ Lee Marlow ▶ Nate Nystrom ▶ Nick Robinson ▶ Chad Lockwood ▶ John Pybus ▶ Uwe Freese ▶ Randy Wood ▶ Gregory Haerr ▶ Philipp Pertermann ▶ Gilles Roux ▶ Mark Hillebrand ▶ Damien Teney ▶ Andreas Zwirtes ▶ Kjell Ericson ▶ Jim Hagani ▶ Ludovic Lange ▶ Mike Holden ▶ Simon Elén ▶ Matthew P. OReilly ▶ Christian Schönberger ▶ Henrik Backe ▶ Craig Sather ▶ José Maria Garcia-Valdecasas Bernal ▶ Stevie Oh ▶ Jörg Hohensohn ▶ Dave Jones ▶ Thomas Paul Diffenbach ▶ Roland Kletzing ▶ Itai Shaked ▶ Keith Hubbard ▶ Benjamin Metzler ▶ Frederic Dang Ngoc ▶ Pierre Delore ▶ Huw Smith ▶ Garrett Derner ▶ Barry McIntosh ▶ Leslie Donaldson ▶ Lee Pilgrim ▶ Zakk Roberts ▶ Francois Boucher ▶ Matthias Wientapper ▶ Brent Coutts ▶ Jens Arnold ▶ Gerald Vanbaren ▶ Christi Scarborough ▶ Steve Cundari ▶ Mat Holton ▶ Jan Gajdos ▶ Antoine Cellerier ▶ Brian King ▶ Jiri Jurecek ▶ Jacob Erlbeck ▶ Jean-Philippe Bernardy ▶ Dave Hooper ▶ Jonas Häggqvist ▶ Thom Johansen ▶ Rinat Zakirov ▶ Manuel Dejonghe ▶ Marcoen Hirschberg ▶ Michiel van der Kolk ▶ Tony Motakis ▶ Andy Young ▶ Alexandre Bourget ▶ Richard S. La Charité III ▶ Christian Gmeiner ▶ Tomas Salfischberger ▶ Miika Pekkarinen ▶ Tapio Karppinen ▶ Richard Ottó O'Brien ▶ Luca Burelli ▶ Alessio Lenzi ▶ David Bryant ▶ Martin Arver ▶ Alexander Spyridakis ▶ Pedro Baltazar Vasconcelos ▶ Ray Lambert ▶ Dave Wiard ▶ Pieter Bos ▶ Konstantin Isakov ▶ Bryan Vandyke ▶ Hristo Kovachev ▶ Sander Sweers ▶ Antonius Hellman ▶ Ryan Jackson ▶ Per Holmäng ▶ Frederic Devernay ▶ José M. Fandiño ▶ Gadi Cohen ▶ Naftali Goldstein ▶ David Dent ▶ Frank Dischner ▶ Liberman Shachar ▶ Stephan Wezel ▶ Alyssa Milburn ▶ Kevin Ferrare ▶ Anton Oleynikov ▶ Mark Arigo ▶ Magnus Westerlund ▶ Jake Owen ▶ Mustapha Senhaji ▶ Adam Boot ▶ Jonathan Gordon ▶ Tat Tang ▶ Toshihiko Itoh ▶ David J. Song ▶ Jeong Taek In ▶ Anders Kagerin ▶ Peter D'Hoye ▶ Ben Basha ▶ Brandon Low ▶ Nathan

Hand ▶ Nick Lanham ▶ Sebastian Henriksen ▶ Martin Scarratt ▶ Karl Kurbjun ▶ Tomasz Malesinski ▶ Andrew Pilley ▶ Matt v.d. Westhuizen ▶ Tim Crist ▶ Jvo Studer ▶ Dan Everton ▶ Imre Herceg ▶ Seven Le Mesle ▶ Craig Bachelor ▶ Nikolaj Christensen ▶ Mikael Magnusson ▶ Dominik Wenger ▶ Henrico Witvliet ▶ Andrew Scott ▶ Miguel A. Arévalo ▶ Aaron F. Gonzalez ▶ Aleksey Kozyulin ▶ Jani Kinnunen ▶ Rui Marinho ▶ Alun Thomas ▶ Nils Wallménius ▶ Naoaki Okazaki ▶ Will Dyson ▶ Matthias Mohr ▶ Christian Marg ▶ Eli Sherer ▶ Fredrik Öhrn ▶ Nicolas Pennequin ▶ Ralf Herz ▶ Michael DiFebbo ▶ David Rothenberger ▶ Robert Keevil ▶ Mark Bright ▶ Dominik Riebeling ▶ Alexander Bondar ▶ Peter Cawley ▶ Rani Hod ▶ Tom Ross ▶ Anton Romanov ▶ Jean-Luc Ohl ▶ Steve Bavin ▶ Marianne Arnold ▶ Gaetano Vocca ▶ Frederik Vestre ▶ Wenbin Leo ▶ Tom Evans ▶ Ewan Davies ▶ Frédéric François ▶ Marc-André Moreau ▶ Ioannis Koutoulakis ▶ Alistair Marshall ▶ Karl Ove Hufthammer ▶ Víctor Zabalza ▶ Ulrich Pegelow ▶ Andreas Mattsson ▶ Daniel Ankers ▶ Paul Louden ▶ Rainer Sinsch ▶ Plácido Revilla ▶ Michael Sevakis ▶ Lukas Sabota ▶ Emanuel Zephir ▶ Alexander Levin ▶ Barry Wardell ▶ Lars van de Klomp ▶ Philippe Miossec ▶ Jochen Kemnade ▶ Corry Lazarowitz ▶ Tom Meyer ▶ Laurent Baum ▶ James Teh ▶ Liam Nattrass ▶ Christian Hack ▶ Wade Brown ▶ Vadim Chekan ▶ Christopher Borcsok ▶ Victor Cardenas ▶ Andrew Melville ▶ Pengxuan Liu ▶ Andrew Cupper ▶ Thilo-Alexander Ginkel ▶ Adam Gashlin ▶ Robert Kukla ▶ David Quesada ▶ Jared Stafford ▶ Martin Hensel ▶ Stéphane Doyon ▶ Austin Appel ▶ Andre Smith ▶ Travis Hyyppa ▶ Ian Webber ▶ Pavel Gnelitsa ▶ Lutz Böhne ▶ Will Robertson ▶ Robert Carboneau ▶ Ye Wei ▶ Bryan Childs ▶ Mike Schmitt ▶ Chris Taylor ▶ Tobias Langhoff ▶ Steve Gotthardt ▶ Greg White ▶ Mattieu Favréaux ▶ Malcolm Tyrrell ▶ Piotr Jafiszow ▶ Gary Allen ▶ John BouAntoun ▶ Tomasz Mon ▶ Jakub Matoušek ▶ Albert Veli ▶ Chris Dohan ▶ Takashi Obara ▶ Rene Peinthor ▶ Roan Horning ▶ Ben Keroack ▶ Sean Morrisey ▶ Shay Green ▶ Nick Vanderweit ▶ Simon Menzel ▶ Timo Horstschäfer ▶ Jacco Koning ▶ Chris Ham ▶ Jose Ramon Garcia ▶ Simon Descarpentries ▶ Douglas Valentine ▶ Jacob Gardner ▶ Pascal Briehl ▶ Denis Stanishevskiy ▶ Eddy Coman ▶ Luke Blaney ▶ Mark Reiche ▶ Michal Jevjak ▶ Philippe Latulippe ▶ Mauricio Peccorini ▶ Nathan Hepting ▶ Akio Idehara ▶ Dagni McPhee ▶ Alex Gerchanovsky ▶ Gerhard Dirschl ▶ Ivan Zupan ▶ Alexander Papst ▶ Christoph Reiter ▶ Rhino Banga ▶ Paul Jones ▶ Michael Giacomelli ▶ Alex Wenger ▶ Andree Buschmann ▶ Johnathon Mihalop ▶ Rene Allkivi ▶ Tobias Schladt ▶ John Zhou ▶ Charles Voelger ▶ Gerritt Gonzales ▶ Dieter Pellkofer ▶ Evgeniy Kachalin ▶ Lenny Koepsell ▶ Harry Tu ▶ Pawel Wysocki ▶ Xinlu Huang ▶ Daniel Dalton ▶ Boris Gjenero ▶ Sylvain Fourmanoit ▶ Alex Parker ▶ Mario Lang ▶ Justin Foell ▶ Igor Kuzmin ▶ Adilson Vicente Xavier ▶ Jesse Lockwood ▶ Jonathan Backer ▶ Sofian Babai ▶ Costas Calamvokis ▶ Catalin Patulea ▶ Peter Harley ▶ Max Kelley ▶ Alexander Eickhoff ▶ Pinitnun Shanasabang ▶ Ken Fazzone ▶ David Bishop ▶ Hein-Pieter van Braam ▶ Przemysław Hołubowski

▶ Stepan Moskovchenko ▶ John S. Gwynne ▶ Brian J. Morey ▶ Stijn Hisken ▶ Bertrik Sikken ▶ Karim Boucher ▶ James Espinoza ▶ Franz Rühmland ▶ Jordan Anderson ▶ Maurus Cuelenaere ▶ Chris Allegretta ▶ Alastair S ▶ Martin Crkovský ▶ Ariya Hidayat ▶ Jonas Hurrelmann ▶ Lee Kang Hyuk ▶ Clemens Werther ▶ Robert Menes ▶ Henri Valta ▶ Melba Sitjar ▶ Mehmet Ş. Çatalbaş ▶ Scott Tinman ▶ Alexander Kuzmenkov ▶ Thomas Martitz ▶ Prakarn Sahasoontornvute ▶ George Tamplaru ▶ Apoorva Mahajan ▶ Vuong Minh Hiep ▶ Mateusz Kubica ▶ Frank Gevaerts ▶ Chelo Sacristán ▶ Sascha Wolf ▶ Nickolay Jordanov ▶ Johannes Voggenthaler ▶ Marc Guay ▶ Alex Vanderpol ▶ Jerry Lange ▶ Yohann Misquitta ▶ Keith Perri ▶ Mark Fawcus ▶ Ivan Pesic ▶ Marcel Barbulescu ▶ Phil Light ▶ Rob Purchase ▶ Andreas Müller ▶ Christopher Williams ▶ Martin Ritter ▶ Justin Hannigan ▶ Tomasz Wasilczyk ▶ Kenjiro Arai ▶ John Kaminar ▶ Joris Goosen ▶ Mark Ganson ▶ Davide Gentile ▶ James Vasile ▶ Mohamed Tarek ▶ Mike Burke ▶ Michael Chicoine ▶ Maciej Adamczak ▶ Tomer Shalev ▶ Thibaut Girka ▶ Rasmus Ry ▶ William Poetra Yoga Hadisoeseno ▶ Adrian Osoianu ▶ Martin Pahl ▶ Ori Avtalion ▶ Thomas Schott ▶ Dennis Ivanov ▶ Takumi Suzuki ▶ Shunsuke Shimizu ▶ Tadayuki Nishizono ▶ Jun Gu ▶ Daniel Weck ▶ Clément Pit-Claudel ▶ Jelle Geerts ▶ Tadeusz Pyś ▶ Rostislav Chekan ▶ Florin Popescu ▶ Volker Mische ▶ Vitja Makarov ▶ Francisco Vila ▶ Christian Lees ▶ Rafaël Carré ▶ Denes Balatoni ▶ Roy Wallace ▶ Eric Lassauge ▶ François Dinel ▶ Francesco Rigoni ▶ Joël Puik ▶ Klaas Bosteels ▶ Teruaki Kawashima ▶ Marcin Łukasik ▶ Le Jin ▶ Alex Bennee ▶ Stéphane Quertinmont ▶ Bartosz Fabianowski ▶ Adam Hogan ▶ Andrew Mahone ▶ Anton Veretenenko ▶ Vicente Ibarra ▶ Rui Araújo ▶ Brian Cloutier ▶ Yoshihisa Uchida ▶ Sanggon Lee ▶ Anton Veretenenko ▶ Kaspar Rothenfusser ▶ The libmad team ▶ The wavpack team ▶ The ffmpeg team ▶ The Ogg Vorbis team ▶ The liba52 team ▶ The Speex team ▶ The libfaad team ▶ The Doom team ▶ The gnuchess team ▶ The gnuboy team ▶ The Pacman Instructional Emulator team ▶ The Spectemu team ▶ The libmpeg2 team ▶ The Game_Music_Emu team ▶ The OpenSPC DSP emulator team ▶ The ALAC decoder team ▶ The UCL team ▶ The iPod Linux team ▶ The Vision-8 Emulator team ▶ The robotfindskitten team ▶ The libmtp team ▶ The asap team

G Licenses

G.1 GNU Free Documentation License

Version 1.2, November 2002
Copyright ©2000,2001,2002 Free Software Foundation, Inc.

51 Franklin St, Fifth Floor, Boston, MA 02110-1301 USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

Preamble

The purpose of this License is to make a manual, textbook, or other functional and useful document "free" in the sense of freedom: to assure everyone the effective freedom to copy and redistribute it, with or without modifying it, either commercially or non-commercially. Secondarily, this License preserves for the author and publisher a way to get credit for their work, while not being considered responsible for modifications made by others.

This License is a kind of "copyleft", which means that derivative works of the document must themselves be free in the same sense. It complements the GNU General Public License, which is a copyleft license designed for free software.

We have designed this License in order to use it for manuals for free software, because free software needs free documentation: a free program should come with manuals providing the same freedoms that the software does. But this License is not limited to software manuals; it can be used for any textual work, regardless of subject matter or whether it is published as a printed book. We recommend this License principally for works whose purpose is instruction or reference.

1. APPLICABILITY AND DEFINITIONS

This License applies to any manual or other work, in any medium, that contains a notice placed by the copyright holder saying it can be distributed under the terms of this License. Such a notice grants a world-wide, royalty-free license, unlimited in duration, to use that work under the conditions stated herein. The **"Document"**, below, refers to any such manual or work. Any member of the public is a licensee, and is addressed as **"you"**. You accept the license if you copy, modify or distribute the work in a way requiring permission under copyright law.

A **"Modified Version"** of the Document means any work containing the Document or a portion of it, either copied verbatim, or with modifications and/or translated into another language.

A **"Secondary Section"** is a named appendix or a front-matter section of the Document that deals exclusively with the relationship of the publishers or authors of the Document to the Document's overall subject (or to related matters) and contains nothing that could fall directly within that overall subject. (Thus, if the Document is in part a textbook of mathematics, a Secondary Section may not explain any mathematics.) The relationship could be a matter of historical connection with the subject or with related matters, or of legal, commercial, philosophical, ethical or political position regarding them.

The **"Invariant Sections"** are certain Secondary Sections whose titles are designated, as being those of Invariant Sections, in the notice that says that the Document is released under this License. If a section does not fit the above definition of Secondary then it is not allowed to be designated as Invariant. The Document may contain zero Invariant Sections. If the Document does not identify any Invariant Sections then there are none.

The **"Cover Texts"** are certain short passages of text that are listed, as Front-Cover Texts or Back-Cover Texts, in the notice that says that the Document is released under this License. A Front-Cover Text may be at most 5 words, and a Back-Cover Text may be at most 25 words.

A **"Transparent"** copy of the Document means a machine-readable copy, represented in a format whose specification is available to the general public, that is suitable for revising the document straightforwardly with generic text editors or (for images composed of pixels) generic paint programs or (for drawings) some widely available drawing editor, and that is suitable for input to text formatters or for automatic translation to a variety of formats suitable for input to text formatters. A copy made in an otherwise Transparent file format whose markup, or absence of markup, has been arranged to thwart or discourage subsequent modification by readers is not Transparent. An image format is not Transparent if used for any substantial amount of text. A copy that is not "Transparent" is called **"Opaque"**.

Examples of suitable formats for Transparent copies include plain ASCII without markup, Texinfo input format, LaTeX input format, SGML or XML using a publicly available DTD, and standard-conforming simple HTML, PostScript or PDF designed for human modification. Examples of transparent image formats include PNG, XCF and JPG. Opaque formats include proprietary formats that can be read and edited only by proprietary word processors, SGML or XML for which the DTD and/or processing tools are not generally available, and the machine-generated HTML, PostScript or PDF produced by some word processors for output purposes only.

The **"Title Page"** means, for a printed book, the title page itself, plus such following pages as are needed to hold, legibly, the material this License requires to appear in the title page. For works in formats which do not have any title page as such, "Title Page" means the text near the most prominent appearance of the work's title, preceding the beginning of the body of the text.

A section **"Entitled XYZ"** means a named subunit of the Document whose title either is precisely XYZ or contains XYZ in parentheses following text that translates XYZ in another language. (Here XYZ stands for a specific section name mentioned below, such as **"Acknowledgements"**, **"Dedications"**, **"Endorsements"**, or **"History"**.) To **"Preserve the Title"** of such a section when you modify the Document means that it remains a section "Entitled XYZ" according to this definition.

The Document may include Warranty Disclaimers next to the notice which states that this License applies to the Document. These Warranty Disclaimers are considered to be included by reference in this License, but only as regards disclaiming warranties: any other implication that these Warranty Disclaimers may have is void and has no effect on the meaning of this License.

2. VERBATIM COPYING

You may copy and distribute the Document in any medium, either commercially or noncommercially, provided that this License, the copyright notices, and the license notice saying this License applies to the Document are reproduced in all copies, and that you add no other conditions whatsoever to those of this License. You may not use technical measures to obstruct or control the reading or further copying of the copies you make or distribute. However, you may accept compensation in exchange for copies. If you distribute a large enough number of copies you must also follow the conditions in section 3.

You may also lend copies, under the same conditions stated above, and you may publicly display copies.

3. COPYING IN QUANTITY

If you publish printed copies (or copies in media that commonly have printed covers) of the Document, numbering more than 100, and the Document's license notice requires Cover Texts, you must enclose the copies in covers that carry, clearly and legibly, all these Cover Texts: Front-Cover Texts on the front cover, and Back-Cover Texts on the back cover. Both covers must also clearly and legibly identify you as the publisher of these copies. The front cover must present the full title with all words of the title equally prominent and visible. You may add other material on the covers in addition. Copying with changes limited to the covers, as long as they preserve the title of the Document and satisfy these conditions, can be treated as verbatim copying in other respects.

If the required texts for either cover are too voluminous to fit legibly, you should put the first ones listed (as many as fit reasonably) on the actual cover, and continue the rest onto adjacent pages.

If you publish or distribute Opaque copies of the Document numbering more than 100, you must either include a machine-readable Transparent copy along with each Opaque copy, or state in or with each Opaque copy a computer-network location from which the general network-using public has access to download using public-standard network protocols a complete Transparent copy of the Document, free of added material. If

you use the latter option, you must take reasonably prudent steps, when you begin distribution of Opaque copies in quantity, to ensure that this Transparent copy will remain thus accessible at the stated location until at least one year after the last time you distribute an Opaque copy (directly or through your agents or retailers) of that edition to the public.

It is requested, but not required, that you contact the authors of the Document well before redistributing any large number of copies, to give them a chance to provide you with an updated version of the Document.

4. MODIFICATIONS

You may copy and distribute a Modified Version of the Document under the conditions of sections 2 and 3 above, provided that you release the Modified Version under precisely this License, with the Modified Version filling the role of the Document, thus licensing distribution and modification of the Modified Version to whoever possesses a copy of it. In addition, you must do these things in the Modified Version:

A. Use in the Title Page (and on the covers, if any) a title distinct from that of the Document, and from those of previous versions (which should, if there were any, be listed in the History section of the Document). You may use the same title as a previous version if the original publisher of that version gives permission.

B. List on the Title Page, as authors, one or more persons or entities responsible for authorship of the modifications in the Modified Version, together with at least five of the principal authors of the Document (all of its principal authors, if it has fewer than five), unless they release you from this requirement.

C. State on the Title page the name of the publisher of the Modified Version, as the publisher.

D. Preserve all the copyright notices of the Document.

E. Add an appropriate copyright notice for your modifications adjacent to the other copyright notices.

F. Include, immediately after the copyright notices, a license notice giving the public permission to use the Modified Version under the terms of this License, in the form shown in the Addendum below.

G. Preserve in that license notice the full lists of Invariant Sections and required Cover Texts given in the Document's license notice.

H. Include an unaltered copy of this License.

I. Preserve the section Entitled "History", Preserve its Title, and add to it an item stating at least the title, year, new authors, and publisher of the Modified Version as given on the Title Page. If there is no section Entitled "History" in the Document,

create one stating the title, year, authors, and publisher of the Document as given on its Title Page, then add an item describing the Modified Version as stated in the previous sentence.

J. Preserve the network location, if any, given in the Document for public access to a Transparent copy of the Document, and likewise the network locations given in the Document for previous versions it was based on. These may be placed in the "History" section. You may omit a network location for a work that was published at least four years before the Document itself, or if the original publisher of the version it refers to gives permission.

K. For any section Entitled "Acknowledgements" or "Dedications", Preserve the Title of the section, and preserve in the section all the substance and tone of each of the contributor acknowledgements and/or dedications given therein.

L. Preserve all the Invariant Sections of the Document, unaltered in their text and in their titles. Section numbers or the equivalent are not considered part of the section titles.

M. Delete any section Entitled "Endorsements". Such a section may not be included in the Modified Version.

N. Do not retitle any existing section to be Entitled "Endorsements" or to conflict in title with any Invariant Section.

O. Preserve any Warranty Disclaimers.

If the Modified Version includes new front-matter sections or appendices that qualify as Secondary Sections and contain no material copied from the Document, you may at your option designate some or all of these sections as invariant. To do this, add their titles to the list of Invariant Sections in the Modified Version's license notice. These titles must be distinct from any other section titles.

You may add a section Entitled "Endorsements", provided it contains nothing but endorsements of your Modified Version by various parties–for example, statements of peer review or that the text has been approved by an organization as the authoritative definition of a standard.

You may add a passage of up to five words as a Front-Cover Text, and a passage of up to 25 words as a Back-Cover Text, to the end of the list of Cover Texts in the Modified Version. Only one passage of Front-Cover Text and one of Back-Cover Text may be added by (or through arrangements made by) any one entity. If the Document already includes a cover text for the same cover, previously added by you or by arrangement made by the same entity you are acting on behalf of, you may not add another; but you may replace the old one, on explicit permission from the previous publisher that added the old one.

The author(s) and publisher(s) of the Document do not by this License give permission to use their names for publicity for or to assert or imply endorsement of any Modified Version.

5. COMBINING DOCUMENTS

You may combine the Document with other documents released under this License, under the terms defined in section 4 above for modified versions, provided that you include in the combination all of the Invariant Sections of all of the original documents, unmodified, and list them all as Invariant Sections of your combined work in its license notice, and that you preserve all their Warranty Disclaimers.

The combined work need only contain one copy of this License, and multiple identical Invariant Sections may be replaced with a single copy. If there are multiple Invariant Sections with the same name but different contents, make the title of each such section unique by adding at the end of it, in parentheses, the name of the original author or publisher of that section if known, or else a unique number. Make the same adjustment to the section titles in the list of Invariant Sections in the license notice of the combined work.

In the combination, you must combine any sections Entitled "History" in the various original documents, forming one section Entitled "History"; likewise combine any sections Entitled "Acknowledgements", and any sections Entitled "Dedications". You must delete all sections Entitled "Endorsements".

6. COLLECTIONS OF DOCUMENTS

You may make a collection consisting of the Document and other documents released under this License, and replace the individual copies of this License in the various documents with a single copy that is included in the collection, provided that you follow the rules of this License for verbatim copying of each of the documents in all other respects.

You may extract a single document from such a collection, and distribute it individually under this License, provided you insert a copy of this License into the extracted document, and follow this License in all other respects regarding verbatim copying of that document.

7. AGGREGATION WITH INDEPENDENT WORKS

A compilation of the Document or its derivatives with other separate and independent documents or works, in or on a volume of a storage or distribution medium, is called an "aggregate" if the copyright resulting from the compilation is not used to limit the legal rights of the compilation's users beyond what the individual works permit. When the Document is included in an aggregate, this License does not apply to the other works in the aggregate which are not themselves derivative works of the Document.

If the Cover Text requirement of section 3 is applicable to these copies of the Document, then if the Document is less than one half of the entire aggregate, the Document's Cover Texts may be placed on covers that bracket the Document within the aggregate, or the electronic equivalent of covers if the Document is in electronic form. Otherwise they must appear on printed covers that bracket the whole aggregate.

8. TRANSLATION

Translation is considered a kind of modification, so you may distribute translations of the Document under the terms of section 4. Replacing Invariant Sections with translations requires special permission from their copyright holders, but you may include translations of some or all Invariant Sections in addition to the original versions of these Invariant Sections. You may include a translation of this License, and all the license notices in the Document, and any Warranty Disclaimers, provided that you also include the original English version of this License and the original versions of those notices and disclaimers. In case of a disagreement between the translation and the original version of this License or a notice or disclaimer, the original version will prevail.

If a section in the Document is Entitled "Acknowledgements", "Dedications", or "History", the requirement (section 4) to Preserve its Title (section 1) will typically require changing the actual title.

9. TERMINATION

You may not copy, modify, sublicense, or distribute the Document except as expressly provided for under this License. Any other attempt to copy, modify, sublicense or distribute the Document is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

10. FUTURE REVISIONS OF THIS LICENSE

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns. See http://www.gnu.org/copyleft/.

Each version of the License is given a distinguishing version number. If the Document specifies that a particular numbered version of this License "or any later version" applies to it, you have the option of following the terms and conditions either of that specified version or of any later version that has been published (not as a draft) by the Free Software Foundation. If the Document does not specify a version number of this License, you may choose any version ever published (not as a draft) by the Free Software Foundation.

ADDENDUM: How to use this License for your documents

To use this License in a document you have written, include a copy of the License in the document and put the following copyright and license notices just after the title page:

> Copyright ©YEAR YOUR NAME. Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.2 or any later version published by the Free Software Foundation; with no Invariant Sections, no Front-Cover Texts, and no Back-Cover Texts. A copy of the license is included in the section entitled "GNU Free Documentation License".

If you have Invariant Sections, Front-Cover Texts and Back-Cover Texts, replace the "with...Texts." line with this:

> with the Invariant Sections being LIST THEIR TITLES, with the Front-Cover Texts being LIST, and with the Back-Cover Texts being LIST.

If you have Invariant Sections without Cover Texts, or some other combination of the three, merge those two alternatives to suit the situation.

If your document contains nontrivial examples of program code, we recommend releasing these examples in parallel under your choice of free software license, such as the GNU General Public License, to permit their use in free software.

G.2 The GNU General Public License

Version 2, June 1991
Copyright © 1989, 1991 Free Software Foundation, Inc.

51 Franklin Street, Fifth Floor, Boston, MA 02110-1301, USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software—to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Library General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

GNU General Public License

Terms and Conditions For Copying, Distribution and Modification

0. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

   Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

   You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

   a) You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.
   b) You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.
   c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print

such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:

   a) Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
   b) Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
   c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

   The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

   If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from

the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

   If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

   It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to

decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

   Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

No Warranty

11. Because the program is licensed free of charge, there is no warranty for the program, to the extent permitted by applicable law. Except when otherwise stated in writing the copyright holders and/or other parties provide the program "as is" without warranty of any kind, either expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. The entire risk as to the quality and performance of the program is with you. Should the program prove defective, you assume the cost of all necessary servicing, repair or correction.

12. In no event unless required by applicable law or agreed to in writing will any copyright holder, or any other party who may modify and/or redistribute the program as permitted above, be liable to

YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

Appendix: How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

> <one line to give the program's name and a brief idea of what it does.>
> Copyright (C) <year> <name of author>
>
> This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version.
>
> This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.
>
> You should have received a copy of the GNU General Public License along with this program; if not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301, USA

Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

> Gnomovision version 69, Copyright (C) <year> <name of author>
> Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type 'show w'.
> This is free software, and you are welcome to redistribute it under certain conditions; type 'show c' for details.

The hypothetical commands `show w` and `show c` should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than `show w` and `show c`; they could even be mouse-clicks or menu items—whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:

> Yoyodyne, Inc., hereby disclaims all copyright interest in the program
> 'Gnomovision' (which makes passes at compilers) written by James Hacker.
>
> <signature of Ty Coon>, 1 April 1989
> Ty Coon, President of Vice

This General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Library General Public License instead of this License.